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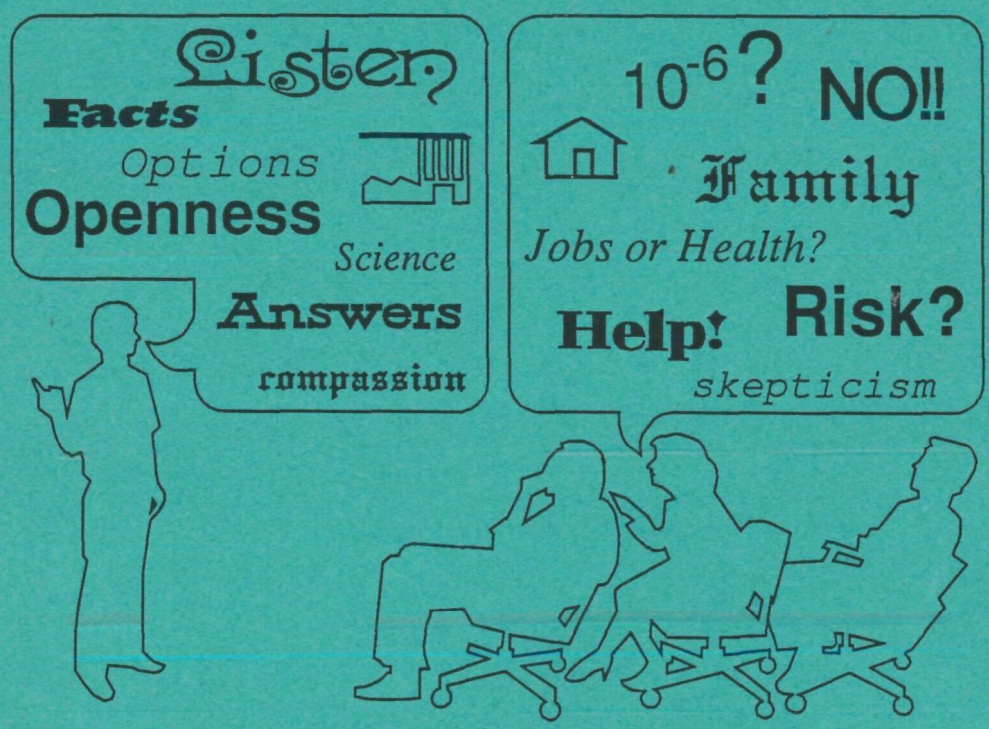
Air Pollution and the Public: A Risk Communication Guide for State and Local Agencies



Air RISC

AIR RISK INFORMATION SUPPORT CENTER

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September 1990

Air Pollution and the Public: A Risk Communication Guide for State and Local Agencies

by

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PREFACE

This manual is about risk communication and public participation. It is for State and local air pollution control agency staff who develop and implement control programs for toxic air pollutants and review permit applications or otherwise evaluate health risks from sources of air toxics. These professionals frequently need to communicate about risks in response to public inquiries or concern. The focus of this manual is on routine situations, but it presents general concepts of risk communication that apply elsewhere.

Also, this manual, while helpful, is not a substitute for training or experience. Risk communication courses are available for State and local agencies, check with your EPA Regional Office for information. When possible, observe public meetings or other fora. Finally, do not overlook those in your agency who have communications expertise, such as those in public information or community relations. Their experience is valuable and their help will save valuable time, minimize grief, and prevent "reinventing wheels." Some sources could be -- EPA community relations specialists, League of Women Voters, county health educators, Agency press officers, or public affairs specialists.

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1.0 INTRODUCTION

Why bother learning about risk communication? Because, like time and tide, communication is not waiting for you, but is an ongoing process. The risk communication process includes what is said, unsaid, printed, acted, implied or ignored. Although a continual process, there are times that intentional communications need to be implemented to address some event or circumstance. Under both routine and event-prompted scenarios, active participation in a controlled exchange of information between the public and your Agency aimed at reaching a mutual understanding (as per Rogers'[1] definition of communication) will result in a more effective regulatory process, with broader public support and greater Agency credibility. Conversely, unintentional communication can send false messages and failure to communicate with the public is in itself a powerful negative message. Being aware of all these factors makes the Agency communicator (essentially anyone who has any contact at all with the public) more effective. It is important to note, however, that even when the public trusts you and understands your point, it provides no guarantee that they will agree with you. (But it increases the likelihood of reaching a mutually acceptable solution.) So, while agencies will likely find that good risk communication takes some time and resources, it will cost more later if the effort is not made.

This manual focuses on routine and event-prompted communication with citizens acting as individuals or members of groups. Techniques for the agency as a regulator communicating with industry as regulatee are not addressed in this manual, but keep in mind that industry is a powerful segment of the public with which State and local agencies should communicate.

This manual emphasizes practical tips on how to plan and carry out risk communication effectively, rather than emphasizing results of research on risk communication. The material has been

synthesized from literature on risk communication and also reflects the experience of the authors. This material does not contain a "magic phrase" that will allow readers to communicate risks more effectively. Rather, this manual is designed to illustrate guidelines and principles that should promote more effective communication. By following the guidance here, the reader will not be able to please everyone all the time, but should come away more frequently with acceptable compromises. Some of the advice offered here may seem to be too costly, require too much staff time, or be unlikely to win the support of management in many state and local agencies. Agencies should consider the advice given here and then see how best to apply it to a given situation. The report tries to separate the essential from the "nice to do."

This report is divided into six sections. Following this introduction (Section 1.0), Section 2.0 gives a basic definition of risk communication, including a discussion of various objectives and problems. Section 3.0 addresses how to plan and implement risk communication activities, and describes identification of objectives, target audiences, and audience concerns; selection and implementation of appropriate communication vehicles; testing of messages; and evaluation of risk communication efforts. Section 4.0 addresses how to explain environmental risk information (including information on the public's perception of risk) risk characteristics, and suggestions for explaining technical information clearly. Section 5.0 suggests ways to cultivate and maintain trust and credibility and handle situations where trust and credibility are low. Section 6.0 gives some suggestions for working with the media, including important characteristics of how environmental risk is perceived by reporters. Finally, the Appendix provides examples of risk communication in the form of typical questions and sample answers. While they are presented as a public meeting format, they are valuable examples of risk communication

principles. References cited in the text are listed at the end of each section.

SECTION 1.0 REFERENCES

1. Rogers, Everett M., and D. L. Kincaid, 1981. Communication Networks: Toward a New Paradigm for Research, New York, NY. The Free Press. p. 64-65.

2.0 WHAT IS RISK COMMUNICATION?

2.1 DEFINITION OF RISK COMMUNICATION[1]

Risk communication is a process used by agencies and the public to discuss environmental hazards, their impacts and how they should be addressed. For agency personnel, the process includes:

- understanding people's perceptions of risk, and their emotions or concerns,
- empathizing with those emotions or concerns,
- dealing with concerns for which agencies have control, and identifying how others will be managed,
- advising people of environmental and public health risk assessments in language that they understand,
- informing the public about current and proposed actions, and
- providing opportunities for public involvement in risk management decisions.

Risk communication embodies a two-way communication process that addresses the different perceptions of risk held by agency personnel and their constituents.

The purpose of conducting risk communication is to inform, and advise the public on health risk assessment information, and to involve them in risk management. As a result of this process, the public can better decide on actions they must take to protect their interests, and agencies can make effective risk management decisions. Such decisions may not always be ideal to the public, but successful risk communication will help engender public trust in our actions.

To help clarify the definition, some common notions of risk communication are offered:

A. Risk Communication is not:

- Co-opting the public.
- Simply selling the Agency decisions to the public.
- Making decisions that cannot be adjusted.
- Using jargon that people do not understand.
- Listening passively without feedback.
- Patronizing the public.
- A "fire fighting" process.
- Just about risk assessment.
- Only the responsibility of community relations or external affairs offices.
- Easy for many agency personnel.

B. Risk Communication is:

- Two-way process of "give and take."
- Active listening and legitimizing emotions.
- Understanding that people can direct their anger at you even though it may be a manifestation of frustration about their situation.
- Showing compassion when people are emotional
- Stating what is considered safe for the individual.
- Explaining risk assessments.
- Talking about probabilities of one-in-a-million.
- Using non-technical language.
- Empowering people to act in their best interest.
- Being objective, open and honest.
- Recognizing that the public has useful input which we may not have considered.
- Telling people what we are planning to do.
- Conveying risk in a larger context.
- Giving clear information to the public.
- Recognizing that there may be no easy answers.
- Acting on what you hear and not ignoring it.
- Being considerate of the needs of your audience.

- Practicing the "Seven Cardinal Rules of Risk Communication."
- Your responsibility as an agency representative.

2.2 OBJECTIVES OF RISK COMMUNICATION

Risk communication can have a number of purposes. Sometimes the specific goal may be to alert people to a particular risk and move them to action. Other times the goal may be to inform or convince individuals that a particular situation does not pose a health risk. The strategies for communicating vary with each particular circumstance. Numerous authors have described general purposes or objectives for risk communication. The following are five common objectives of risk communication:[2]

1. To better educate the public about risk, risk analyses, and risk management; to help individuals interpret risks and to make appropriate decisions. For risk communicators, public education means helping the public understand the complexities of the risk problems and intricacies of the risk assessments.

2. To better inform the public about specific risks and actions taken to alleviate them. This objective is related to a specific risk, its analysis, and the regulatory decisions to address it.

3. To improve the understanding of public values and concerns. A better understanding of public opinions and ideas will help regulators formulate relevant criteria for risk management responsive to public sentiment.

4. To increase mutual trust and credibility between the government agency and the public. Mutual trust and credibility

must exist between the interested parties in order to achieve successful risk communication.

5. To resolve conflicts and controversies. The possibility of conflicts can be reduced by actively involving all concerned parties from the onset of the risk assessment through risk management, in an atmosphere of joint problem solving.

The ideal objectives may be for the public to understand the technical aspects of risk; for the government to understand all of the public's concerns, fears, and values; and for everyone to reach a consensus in solving a problem. In reality, however, this is not always possible due to time, money, personnel, or regulatory constraints. As the preceding objectives indicate, the major goal of risk communication should be to move toward an ideal, where everyone has a positive sense that the Agency is acting to protect public health and the environment, understands the process that the Agency will use, has input to risk management decisions and has the opportunity to disagree.

Each event prompting a need for risk communication will have its own specific objectives. For example, if an agency is developing an air toxics control program and working to define acceptable levels of toxic air pollutants, one risk communication objective may be to define the ambient concentrations considered acceptable to the constituents of the agency. If an agency is responding to a permit application for construction of a new source, or to inquiries about the health risk posed by an existing source, the risk communication objective may be to convey to the public that, from an air pollution standpoint, the source will not pose a health risk.

Before designing a risk communication program or a specific "message," it is crucial for an agency to determine its objectives.

2.3 PROBLEMS IN RISK COMMUNICATION

As previously mentioned, risk communication is an ongoing, interactive process. Linear communication theory states that this process involves: (1) the message, the relevant information to be communicated; (2) the source, the messenger who transmits the message; (3) the mechanism or channel through which the message is transmitted; and (4) the receiver, the party who receives the message. While many problems are also related to context, use of these terms simplifies discussion of problems inherent in a risk communication event. Many barriers to communication are associated with each of these four items:

1. Message problems: limitations in the procedures used to assess air toxics risks that form the basis of the risk message. These can include the following:

* highly technical and scientific analyses that are meaningless to laypeople (without intervening explanation);
* limited scientific methods, data, and models that can result in uncertain risk assessments;
* difficulties in assessing, human exposure, the effects of mixtures, and exposures to sensitive populations (e.g., children).

2. Source problems: limitations of the risk communicators and risk assessment experts. These can include the following:

* use of bureaucratic, technical, or scientific language to transmit information;
* resource, legal, and/or institutional constraints on analysis, authority, and actions;
* disagreement of interpretations among experts;

* failure to disclose limitations of risk assessments and prevailing uncertainties; and
* limited understanding of the concerns, interests, emotions, values, fears, and preferences of the audience in question;
* personal style which is defensive, condescending, unprofessional, or otherwise offensive to the audience.

3. Channel problems: limitations of the means or media through which information is relayed. These can include the following:

* structured hearings where by law the panel is instructed to listen but not respond;
* selective and/or biased media coverage focusing on drama, conflict, or corruption;
* oversimplifications, distortions, and inaccuracies in interpreting technical risk information; and
* premature disclosure of information.

4. Receiver problems: limitations of the intended recipients of the risk information. These can include the following:

* inaccurate perceptions of risk values;
* lack of interest in risk problems;
* difficulties in understanding information;
* demands for scientific certainty;
* overconfidence in one's ability to avoid danger; and
* unrealistic expectations about the effectiveness of regulatory action and risk management;
* recognition of and/or emphasis on different aspects of risk.

In many respects, the skills that one would apply to any communication endeavor are applicable to risk communication efforts. There too, the message, the source, the channel, and the receiver are critical considerations in communicating effectively. Recognizing these elements and working to minimize problems associated with them are essential to successful risk communication.

In summary, there are four important suggestions for successful risk communication:[3]

1. Know your risk communication problem.
2. Know your risk communication objectives.
3. Use simple, nontechnical language.
4. Listen to your audience and know the content and context of their concerns.

Implementation of these suggestions is the focus of Sections 3.0 through 6.0. Section 3.0 addresses defining risk communication objectives and identifying and characterizing the audience's concerns. Section 4.0 addresses choice of language. Section 5.0 describes the importance of trust and credibility. Section 6.0 addresses dealing with the media, a particularly important audience.

SECTION 2.0 REFERENCES

1. Risk Communication and Public Involvement Course. US EPA, Region IX, San Francisco, California 94105.

2. Keeney, R.L. and D. von Winterfeldt. "Improving Risk Communication." Risk Analysis. Vol. 6, No.4, 1986.

3. Covello, Vincent; von Winterfeldt, D.; Slovic, P. "Risk Communication: An Assessment of the Literature on Communicating Information about Health, Safety and Environmental Risks." (A draft preliminary report to the Environmental Protection Agency.) Institute of Safety and Systems Management, University of Southern California, 1986.

3.0 PLANNING AND IMPLEMENTING RISK COMMUNICATION ACTIVITIES

Planning and preparation are an integral part of the development and implementation of any regulatory program. In implementing air toxics control strategies and regulations, permitting activities and other risk evaluations, it is important that the planning process include consideration of risk communication. Thorough planning is key to success. In addition, almost all state and local air pollution agencies will find themselves in situations where they must explain a source's health risk or a decision making process, or answer questions from citizens or elected officials. Planning ahead for these unplanned communication scenarios will only improve an agency's credibility. Such situations also require careful planning and preparation.

This section discusses the following important components of planning for risk communication with the public and includes tips for implementing these components:

* organizational planning,
* identifying objectives,
* identifying target audiences,
* identifying audience concerns,
* coordinating with other groups,
* choosing appropriate communication vehicles, and
* evaluating risk communication efforts.

3.1 CONDUCT ORGANIZATIONAL PLANNING

An agency's internal organizational climate significantly influences the effectiveness of its risk communication. An agency that encourages internal communication and creative problem solving is more likely to have staff members who interact

with the public in a spirit of trusting and open exchange than an agency with a closed internal agency climate. State and local air agencies developing and implementing air toxics programs should strive for an organizational climate and agency structure that foster good communication; remembering that public participation and public input are more effective the earlier and the more consistently they occur. Organizational planning should include evaluation of needs and resources for good communication. Some examples of these needs are:

1. Time allocated to do planning for communication (there is a significant amount of time that should be legitimized).

2. Time allocated to do evaluations following a communication event (this can be time consuming but has proven to be very productive since risk communication is usually a learned experience which does not come easily).

3. Contractor to provide advice on risk communication and public participation (this can be a valuable and cost effective alternative to having specialized in-house staff).

4. Video equipment, facilities, and specialists to record communication events for the purpose of evaluating and improving future communications (this can be a full time job for a specialist or contracted source).

5. Time allocated to coordinate with related agencies or organizations (this is also time consuming but enhances trust and credibility with the public and results in better solutions).

6. Time and resources for affected staff and managers to take training courses in risks communication, public involvement, active listening, etc.

7. Time spent with senior managers to review risk communication progress, as well as for learning and other needs. (Senior managers can play a major role to encourage, guide and learn from the experiences of their staff. They can also get a better sense of the needs which are required to do a better job.)

Chess (1987) developed a list of suggestions for agency management to help foster effective risk communication[1]. The suggestions, paraphrased below, are based on the assumption that risk communication should complement, and not replace, sound science and meaningful policy development.

With regard to organizational climate and agency structure, agency managers should promote effective risk communication by their own example. Open communication within the agency, where staff members are involved in decision making and encouraged to express diverse viewpoints, fosters openness in efforts outside the agency. Communication specialists in positions at all levels of the agency can help identify community concerns and assist technical and policy staff in interaction with communities. When hiring staff, consider communication abilities and provide risk communication orientation and training for all staff members involved. Finally, make the agency "user-friendly" to those outside the government in order to encourage the public to communicate with the agency.

3.2 IDENTIFY OBJECTIVES - WHY COMMUNICATE?

Defining objectives for risk communication and public participation involves deciding when to begin, and how far the agency should go, in involving the public. In addition, most agencies have statutory requirements for holding public hearings and for public comment periods whenever new regulations are proposed or as part of the permitting process. Although these

mandated objectives for public participation are important, this section will stress that broader objectives are necessary, because using only a public hearing to involve the public in risk issues can result in the less-than-successful "decide, announce, and defend" strategy.

3.2.1 Extent of Public Involvement

In the pamphlet, "Seven Cardinal Rules of Risk Communication"[2], the first rule is, "accept and involve the public as a legitimate partner." The basic premise of this rule is that, in a democracy, people and communities have a right to participate in decisions that affect their lives, property, and the things they value. Thus, the ideal of risk communication in a democracy should be to produce an informed public that is involved, interested, reasonable, thoughtful, solution-oriented, and collaborative. The goal should not be to diffuse public concerns or replace action.

Agencies must set practical goals that not only accommodate the formal requirements and constraints that bound the regulatory development and permitting processes, but also allow for improved understanding of the issues and actions by both the public and the agency through, for example, direct public inquiries to agency staff.[3] To be effective, risk communication should be part of agency routine, not a way to avoid solving problems. Risk communication should complement agencies' primary commitment to sound science and meaningful policy.[4]

In setting objectives for risk communication, the legal requirements (e.g., public hearings, public comment periods after rules are proposed, etc.) and public inquiries should serve as initial bases for planning. Effective risk communication goes beyond statutory requirements to afford an agency the opportunity

to hear public concerns when they can be addressed more easily, and, ideally, to involve the public in decision making processes to the extent practicable. Statutory requirements alone may be too little, too late!

In identifying risk communication objectives, understanding the distinction among levels of citizen participation will help to clarify whether and how far to go beyond the statutory requirements for public involvement. Hance, et al[5] published the "ladder of citizen participation" to illustrate these distinctions:

Level of Participation	Characterization	Example
Citizen Power	Citizens act without communicating with government	volunteer fire department
Power Sharing	Citizens and government solve problems together	citizen oversight and monitoring
Consult 2	Government asks citizens for meaningful input and intends to listen	citizen advisory committees
Consult 1	Government asks citizens for limited input and would prefer not to listen	most public hearings
Inform	Government talks, citizens listen	press releases
Government Power	Government acts without communicating with citizens	enforcement actions

Routine functions of government demand very little citizen participation and therefore, much agency communication is at the level of "Consult 1." It is important, however, to consider increasing the level of public participation when controversy exists, when feelings run high, if the agency genuinely needs input, or if citizens request more participation. No single level is always best, since circumstances surrounding risk communication vary. If the agency knows a particular action is not likely to spark controversy (e.g., a permit renewal of a printing facility that has switched to water-based inks), a public hearing (Inform Level) per the statutory requirements would likely be adequate. However, when public sentiment is intense (as is seen when permitting a municipal or hazardous waste incinerator, for example), more opportunity for citizen involvement is called for (Consult 2 to Power Sharing). Communication with the public is more likely to be successful when an agency begins the process at a higher level of public interaction than if the community insists on moving to a higher level.

3.2.2 Goal Categories

To ensure that an agency planning for risk communication has identified the necessary goals, it is useful to consider different categories of goals.[5] Four categories of goals are: (1) informational goals, to give information to people; (2) organizational goals, to work with the air agency and other agencies to coordinate actions and build credibility; (3) legally mandated goals, to meet the statutory requirements for public involvement; and (4) process goals, to seek public input throughout the rule development or permitting process. Using those categories, some possible goals for state and local air agencies are listed below:

Informational goals

* to respond to the questions and concerns of the community
* to give people the data they need to better understand the extent of the risk
* to tell people what the agency has done, is doing, and plans to do about the problem, and what they cannot do, and why
* to communicate to the public why resources are focused on particular problems

Organizational Goals

* to build and maintain the credibility of the agency in the minds of all affected publics
* to educate the agency in public concerns so the staff can work to minimize public feelings of outrage
* to coordinate actions within the agency and with other agencies so the governmental response is consistent and effective
* to maintain agency efficiency by avoiding unnecessary conflicts with the public

Legally Mandated Goals

* to provide the opportunity to speak at a public hearing and submit written comments on proposed regulations and permit applications

Process Goals

* to make clear what the boundaries of public input can be, given the agencies legal constraints and responsibilities
* to make clear the Agency's mandate and responsibilities
* to be informed about public concerns centering around toxic air pollutants
* to provide maximum opportunities for public input,

including, where appropriate, a chance to help make key decisions

* to solicit public involvement at the beginning and throughout the regulatory development process
* to keep people routinely informed throughout the process, so they do not lose their sense of what the agency is doing
* to incorporate public concerns in the permit review process
* to cultivate a committee of various public interests, educated in air pollution control and risk management, who will bring public concerns to bear in risk management decisions
* to determine what level of risk reduction is acceptable to the public

It is often useful to differentiate between top priority goals and moderate priority goals in each category, limiting the number of goals in each priority group to four. It may also be helpful to set goals jointly with all of the staff involved.

3.3 IDENTIFY TARGET AUDIENCES - WHO IS THE PUBLIC?

Different audiences require different risk communication strategies because groups will have different concerns and different levels of understanding of a risk message; and their concerns, levels of understanding and informational needs may change throughout many risk scenarios. While it may not be possible to try and reach "everybody," there is a need to identify all parties who have an interest or stake in the issue and to offer them the opportunity to be involved in the risk communication exchange. It is likely that situations will arise when the various audiences will be addressed at one time. In these scenarios, planning is especially difficult and important.

For identifying interested groups, a three-step networking process[5] can be useful:

* make a list of the different aspects of the issue and the types of organizations that might be concerned with these aspects,
* contact these organizations and interest groups with which you are familiar, and
* ask these groups the names of others who might have an interest in the issue.

Identifying audiences is a continuous process, so it is important to use sign-up sheets at meetings and similar tools to identify new parties.

As a starting point, many agencies rely on existing mailing lists and lists of people or groups who have testified at public hearings or attended other meetings. Lists from other agencies that have held public hearings about related issues, as well as newspaper coverage of related issues may help identify interested individuals or groups. If an agency is initiating risk communication because of a particular permit application, groups who have an interest in the site should also be included.

The audience, however, should not be limited to just geographical neighbors. There are many groups to consider based on common demographic, educational, or vocational interests, which will not necessarily be within the geographic or political boundaries. The list below may help an agency identify target groups who have a stake in particular issues.

local government agencies	local elected officials
local businesses	chambers of commerce

Better Business Bureaus	unions
other employee groups	professional organizations
medical associations	senior citizen associations
educational/academic groups	environmental groups
civic organizations	sporting/recreation clubs
community associations	public interest groups
property owners	realtors
religious organizations	media

In addition to these types of groups, air agency staff members may be members of or aware of additional groups interested in the particular issues. Also, it can be useful to ask local groups about other groups which may be interested. It is important to identify all interested groups, for the publicity will likely pull them out of the woodwork and they will feel ignored if they have not been contacted.

When identifying audiences, it is important to recognize that key audiences include groups that have concerns they want to share with the agency, as well as groups the agency feels need to be informed. Keeping this in mind again stresses the point that effective risk communication is a mutual exchange, where the participants continue to exchange information back and forth. Failure to establish two-way exchange may get the same feedback eventually, but under less than ideal circumstances.

Another way of encouraging communication with a variety of interested groups is through the formation of public advisory groups, representatives from a variety of organizations who would meet over time and advise the agency on air toxics issues. Such a committee might have representatives from any number of the groups suggested. One key here is "representation." Committee members need to take information back to their respective groups for discussion so that the discussion and concerns raised within the committee truly represent the organizations. Many state and

local agencies have used such groups successfully during the development of air toxics programs.

Once the various audiences have been identified, it may become important to categorize or group them according to types of information needs, concerns, their message or other special considerations. This step will be useful later on when designing your risk messages and selecting vehicles or techniques for communication.

3.4 IDENTIFY AUDIENCE CONCERNS

This section examines ways to find out the concerns of various audiences. The first part of this section describes how the public views risk, a perspective that typically differs from the perspective of government agencies. Section 3.4.2 discusses ways to gather information on public concerns, and Section 3.4.3 gives tips on listening effectively.

3.4.1 How Does the Public Look at Risk?

Since effective communication is more difficult in a hostile atmosphere, agencies must understand how the public perceives risk in order to avoid or reduce hostile feelings. Government agencies and the public often do not view risk in the same way and can, therefore, come to different conclusions regarding the acceptability of a risk. Agencies rely on scientific risk assessments and environmental monitoring, while the public takes into account many other social, economic and historical factors. The technical aspects studied by air agencies have been called the "hazard" dimension, and non-technical factors have been referred to as the "outrage" dimension of risk because they can produce feelings of outrage in people.[5] These two approaches to

risk are also referred to as technical rationality and cultural or experiential rationality.[15]

For successful risk communication, agencies must realize the importance of experiential rationality factors and the validity of this "outrage" dimension. Eleven "outrage factors" are listed below[5,7] along with a discussion of how air agencies can take these into consideration when facing air toxics issues. Suggestions presented in Section 4.0 also address ways to minimize some of these factors.

1. Voluntary versus involuntary. Risks that are voluntary are considered less serious (i.e., less dangerous) than those that are imposed. That is to say, when people feel that a risk is being imposed on them, they perceive it as outrageous and they attribute a higher level of risk regardless of the hazard. In such cases, they may tend to focus on the government's process and pay far less attention to substantive risk issues.

Toxic air emissions are not usually a matter of voluntary risk. Early public involvement in decision making can help reduce outrage from involuntary emissions even when public involvement must occur within the context of mandated agency decision making procedures.

2. Controlled by the "system" versus controlled by the individual. People tend to view risks that they do not control as more threatening than those that they can do something about, regardless of the actual hazard.

Allowable ambient concentrations of toxic pollutants are not a matter of individual control, but this factor tells air agencies that the public will feel less outrage, and thus view the situation as less risky, when they feel that they have a

voice in the decision making concerning control of air toxics and permitting industrial facilities. For example, agencies that turn to citizen committees to review proposed ambient levels for toxic air pollutants, help to turn over some of the responsibility for control to the public, especially if the committees allow input and discussion by the public attending the meetings. The public feels a sense of control and so is more content with decisions made.

3. Fair versus unfair. Risks that seem fair are more acceptable than those that seem unfair. Getting stuck with a risk for which the public realizes little benefit makes the risk seem unfair and, therefore, more serious. Risks are more readily accepted when those who benefit bear the risk. When communities depend on one major industry for jobs, they sometimes see pollution from that industry as less hazardous, fostering the "smells like money to me" attitude. This same factor can cause a divisiveness in a community between those who depend on the risk source for a benefit and those who do not.

Risk levels that the public helped to set will also seem more acceptable, more fair, than levels that an agency set with no consultation and consideration of public sentiment.

4. Trustworthy sources versus untrustworthy sources. People's perception of a risk is often a function of how much they trust the organization seemingly imposing or allowing the risk or how credible the source of risk information is.

This speaks to the importance of making sure that an agency is perceived as a credible and trustworthy source and to the need for developing an understanding with credible sources who can help to communicate the agency's message to the public. Many state and local risk communication situations boil down to this

issue; therefore, establishing credibility is crucial. Tips for developing trust and credibility are discussed in Section 5.0.

5. Morally relevant versus morally neutral. Risks that seem ethically objectionable will seem more dangerous than those that do not. Most people feel that pollution is morally wrong, and this makes talk of allowing more pollution because of the high cost of reduction sound very callous.

This feeling contributes to the desire on people's part to reach a zero risk level or a level of total control of emissions. Recognizing and acknowledging this as an ultimate goal can help you present the public with more reachable, and realistic, objectives.

6. Natural versus artificial. Natural risks seem less hazardous than artificial (i.e., man-made) risks. Natural risks provide no "villain," while emissions from a chemical plant provide a focus for anger in the plant managers and the permitting agency.

Toxic air pollutants obviously pose artificial risks. The agency could be the focal point of public anger, if it appears to be accepting, or even imposing, artificial risks from toxics sources. To minimize the appearance of favoring the source, agencies should take care to maintain and convey technical objectivity.

The source could be a focal point for anger as well. A source that has developed good community relations experiences less public animosity than one that has not.

7. Exotic versus familiar. Exotic risks seem more risky than familiar risks. Household cleaners seem less risky than the chemical plant that makes the cleaners.

Toxic pollutants, with their long names, can certainly seem exotic. The challenge here is to try to remove some of the mystery around these pollutants and their effects. Demystifying the substance will help get the risk message across.

8. Memorable versus not memorable. Risks that are associated with other, memorable events are considered more risky.

This factor speaks to the need to dissociate, if appropriate, agency actions from any memorable event. Do not avoid mentioning the event. Rather, acknowledge to people that the event was, indeed, significant and worrisome and give the features that make the present circumstances different, if this is the case.

9. Dreaded versus not dreaded. Risks that are "dreaded" seem more serious than those that carry less dread. For example, toxic air pollutants that cause cancer may seem more risky, and less acceptable, than those that can cause emphysema, even though both diseases can be fatal.

Educate people about the effects of emissions in question and the significance of particular effects. If the audience is not aware of the differences, differentiate between health effects associated with acute exposure and those associated with chronic exposure. The risk message must put the effects into the proper perspective, so that people differentiate between significant and less significant risks.

10. Undetectable versus detectable. Risks that are undetectable create more fear than detectable risks when people are aware of both types of hazards. If a person understands that a substance is hazardous, but he is able to detect exposure and therefore to avoid it, it seems safer than a situation in which

he cannot detect exposure to that hazard. For instance, it is possible to detect poisonous household substances near young children and to avoid exposure to the children, but one cannot detect pesticide residues on vegetables. Similarly, risks whose effects may take years to show up (e.g., cancer) may be more likely feared than risks whose effects are more immediate and identifiable (e.g., poisoning).

Toxic air emissions may seem undetectable to the public, but ambient levels may have been carefully monitored and/or modeled. Making this factual information available will help dissipate this type of outrage.

11. Scientific understanding versus uncertainty. Risks that are well understood by science are more acceptable than those that are not. Uncertain or contested risks seem less acceptable than those that are easily explained.

This is not to say that uncertainties should be hidden; clear risk messages that acknowledge points of uncertainty are important to maintaining credibility. Portraying uncertainty is discussed in more detail in Section 4.0.

3.4.2 Gathering Information to Identify Public Concerns

Agency risk communicators should listen to the public to identify what information the public wants and then make sure that the technical information gathered by the agency addresses their citizen's concerns. For example, people want to know how a risk will affect them personally because they want to protect what they value. This leads to questions such as, "Should my children play outside?"; "Is it safe to eat vegetables from my garden?"; or "Won't my property value go down?" Another concern might be over what can be done to reduce emissions. Chess, et al[6] categorize public concerns as health and lifestyle concerns,

data and information concerns, process concerns, and risk management concerns.

Health and lifestyle concerns pertain to how the particular situation will affect a person and his family. Such concerns are often over health and quality of life. Data and information concerns describe the technical facts and associated uncertainties (e.g., are studies correct, how local exposures compare to standards, the worst case scenario). Process concerns pertain to how communication with the agency is carried out and how decisions are made. Trust and credibility are closely associated with process concerns. Finally, risk management concerns pertain to how the risk will be handled and when, including the cause(s) of the problem, options for correcting the problem, and types of oversight.

Methods for discovering what public concerns are include interviews, written or telephone surveys, focus groups, informal information gathering, review of letters to the editor and news items, and use of existing public poll information. The focus group technique, new for many regulatory agencies, is a more usable and affordable technique for state and local agencies and requires some explanation.

Focus groups allow risk messages to be tested on a small group to see if they are effective. Focus groups are assembled for informal discussions in which a skilled moderator probes people's attitudes and opinions on a specific topic. Eight to ten people is an ideal size and sessions usually last about two hours. Participants can be selected from a specific target group or from the general population of an area. However, considerable thought should be given to the make-up of the group and care taken in generalizing results. The format for focus groups can vary, including answering and discussing survey questions, critiquing risk messages, or discussing risk perceptions. Tasks

or exercises are often used to stimulate discussion. Focus groups can be used effectively in six areas of risk communication:[8]

* exploring risk perceptions
* evaluating perceptual cues and information processing
* presenting risk communication materials
* selecting risk communication channels
* designing risk mitigation policies
* assessing risk communication effectiveness
* exploring agency credibility

Because designing air toxics programs, implementing toxics control programs, or developing control procedures may represent "new" services, air agencies may want to consider the use of focus groups to solicit citizen concerns, feelings, and suggestions. Focus groups (if designed carefully) can be a valuable tool and serve as a critical source of information to assist in risk communication efforts. In fact, the chemical industry is using focus group techniques to respond to the information requirements of the Superfund Amendments and Reauthorization Act.

3.4.3 Effective Listening

Effective listening means trying to eliminate the receiver problems described in Section 2.0. Getting to know the audience and their concerns before and after relaying the risk message requires effective listening. Specifically, before developing effective risk messages, risk communicators must determine what is relevant to the audience, what information is needed to communicate what is relevant, and how the risk information can be presented effectively to meet both the communicator's message needs and objectives and the receiver's concerns. This is to say, good risk communicators are necessarily good listeners.[9]

In order to determine the public's concerns, it is important to learn and practice good listening skills. Eastwood Atwater developed a list of ten guidelines for good listening:[10]

1. Become aware of your own listening habits.

2. Share responsibility for the communication. If you are unclear about what a speaker is saying, it is your responsibility to let the speaker know this by asking for clarification or restating what you heard and asking to be corrected.

3. Be physically attentive by looking at the speaker and using posture and gestures that show you are listening.

4. Concentrate on what the speaker is saying.

5. Listen for the total meaning, including feelings as well as facts.

6. Observe the speakers nonverbal signals, such as facial expression, tone, rate of speech, and body language.

7. Adopt an accepting attitude toward the speaker. Such acceptance will make speakers feel more free to say what they really want to say.

8. Express empathetic understanding and actively reflect what the speaker has said in order to discover feelings and true meaning. When people are speaking emotionally, respond to their emotions, and do not simply cite data.[5]

9. Listen to yourself in terms of the feelings the speaker has generated in you. Expressing your feelings will help you listen better.

10. Show that you have listened by taking appropriate action.

Risk communication experience has shown the importance of listening for feelings. Values and feelings are a legitimate aspect of environmental health issues and such concerns can convey valuable information. For instance, a community's emotional statements about odors from a facility can provide information about types of emissions and emission patterns, etc.[5] Encourage people to be as specific as possible about their fears and concerns.

Experience shows that citizens will often use the results of technical risk assessments or the formal public hearing process as a lever for public involvement in the decision. It is important to "listen" and differentiate risk assessment issues (Am I safe?) from risk management issues (Why should I accept that level of air toxics as safe?). People are uncomfortable with things that they cannot assess for themselves, such as air toxics, which cannot necessarily be seen or smelled. Listen for questions regarding the uncertainty of air toxic emissions and potential health effects and be prepared to respond to these issues.

3.4.4 Not in My Backyard

One of the most common (and most frustrating) problems for government agencies involved in permitting new sources or evaluating health risks from existing sources is expression of the "not in my backyard" or NIMBY attitude by the public. State agency staff and industrial permittees often express dismay that no amount of information can dissuade the public from this stance. Unfortunately, it is an oversimplification on the part of scientists, engineers, and regulators to assume that this is a

kneejerk reaction by the public, that they just do not "understand" that perhaps the facility "is necessary" or "will not cause a risk." In fact, the public is not necessarily not listening or "understanding," but they are not agreeing. Rather than dismiss this as irrational behavior on the part of the public, agencies need to consider if and why people do not want to agree with the information the agency wants to convey.

In the case of some members of the public, the NIMBY attitude may in fact be a desire for a risk-free society or at least a "risk free" backyard. The NIMBY attitude, however, is generally much more complex and involves a variety of factors.

Of particular importance is often the issue of control - who decides - and lack of trust or perceived credibility of the industrial source and/or the agencies. Because current statutes and public involvement processes are not specifically established to allow communities to make decisions or have control, citizens will often use the permit process as a lever to dispute the decision. In fact, citizens often raise technical questions and challenge the results of the air modeling and risk assessment to block or fight permitting decisions. It is important for all agency staff to try to determine when health or other citizens' concerns are legitimately raised and when the primary concern is the decision to site a facility. Both are legitimate, but each requires a different risk communication strategy.

To be effective, agency communicators must explicitly acknowledge the NIMBY attitude. For example, at public meetings, be sure to respond to health concerns or feelings by saying, "I hear that you are concerned about the emissions from this facility. We are also concerned about those types of issues, so we did exposure modeling and a health assessment which have shown there to be negligible health risk."

To determine whether the NIMBY attitude may be at work, try asking for clarification from the questioner. For example, first repeat (mirror) the specific question or statement raised. Then follow up with some probing or clarifying questions such as, "...are you worried about possible health impacts?...are you concerned about property values?...increased traffic?" Ultimately, after responding to a consecutive series of clarifying questions, you can ask more direct things such as, "...are you (angry, concerned, worried) that you do not have the final say in this decision?" The order of the questions is important. Respond to concerns but do not try to indicate the NIMBY-type concerns are inappropriate. That will only heighten public concern and cause communication problems.

Another way to explore NIMBY is to explore the issues of control, power sharing, and trust and credibility. Again, this means asking clarifying questions and being prepared to deal with feelings and emotions, in addition to facts.

For industry or an air agency to deal more effectively with the NIMBY attitude, it requires more power sharing in the decision process. This does not have to translate to who makes the decision of whether to permit or not. Obviously, that is a decision with statutory and technical requirements which must be met by responsible agency staff. However, risk management decisions (permitting is a risk management decision) are not purely technical or legal, and always involve a number of subjective judgments as well as objective factors like traffic, property values, etc.. Some of these may be areas where true citizen input can occur (i.e., power sharing). To reduce the influence of the NIMBY attitude, give citizens more control. Otherwise the risk is perceived as involuntary and thus unacceptable.

Some examples of innovative citizen involvement and power sharing have been established through citizen advisory committee input or negotiation and mediation. Drawing on the expertise of experienced risk communicators and negotiators can assist interested parties in identifying problems and defining options and solutions that are mutually acceptable. Many people confuse this type of involvement as just providing incentives or "sweetening the pot" for the community. Be aware, if the NIMBY attitude and other risk perception factors are at play, these tactics could heighten public resistance and skepticism. Instead, focus on giving citizens more input into the process, as well as more information on uncertainties and what can be done to "protect" them in the face of uncertainties and inevitable human error. Monitoring plans where citizens have easy access to the data, plant tours and plant emergency drills are some examples of innovative ways to involve the public and build trust and credibility.

The NIMBY attitude may never be totally erased from a community. However, strong risk communication that is ongoing and involves the public in decision making can greatly reduce the overall impact of the NIMBY attitude.

3.5 COORDINATE WITH OTHER GROUPS

Coordination with other groups is important for four reasons. First, the agency wants to give a consistent message. Second, it is desireable, if possible, to address audience concerns that may not involve air issues. Third, help from outside credible sources can be useful in getting your risk message across, since such sources have built up trust and credibility with the public. Finally, certain parts of the message should come from industry.

The first reason, projecting a consistent message from the agency, requires good communication among the agency staff so that all staff members who deal with the public, from agency directors to receptionists to field sampling technicians, will present a consistent approach to risk communication.

When addressing public concerns that go beyond air issues, it is important to remember that the public will see a situation, such as construction of a new plant, from various viewpoints which encompass health issues, property values, land use, traffic control, etc. If the air agency is dealing with a permit application for a new facility, for instance, the agency may be in a position to provide the public with additional information concerning that facility.

If possible, coordinate with other agencies that will issue permits to the new facility, such as land use permits, water quality permits, and wetlands permits. This might include inviting such agencies to hold joint meetings or jointly prepare information brochures, fact sheets, etc., or at a minimum, understanding the roles of other agencies and knowing names and telephone numbers of contacts. Likewise, air agencies can look for the opportunities that may be offered from other agencies to discuss air issues with the public.

If overt, planned coordination is not possible, at a minimum avoid responding, "It's not my responsibility," to public questions and concerns. Tell the concerned citizen the name and telephone number of an appropriate contact. This will reduce citizen frustration and potential "outrage." To avoid giving the impression of "passing the buck," it is important to explain that the person to whom they were referred, "can help you more than I."

Enlisting help from other credible sources refers to getting help from individuals or groups that have the trust of the public. This could include educators, medical professionals, civic organizations, and any other groups that are known and trusted in the public's views. Such groups will not only be good sources of information on the public's concerns, but can help an agency in explaining risk messages. These sources could be contacted as individuals or through organizations, in the case of educators and medical professionals. Ongoing relationships with such groups can help enlist their support. Be aware of two things, however: (1) you do not have a monopoly on information, and (2) experts may disagree.

Industry has an important role to play in the risk communication effort. When called upon, the source representatives should be able to communicate to the public, in an understandable form, information similar to that required on an air quality permit application such as chemicals emitted, quantities emitted, control measures provided, effectiveness of control measures, and the like. Industry representatives may also be called upon by the public to address concerns not directly related to the matter at hand such as accident prevention measures, worker safety, or job security.

3.6 SELECT THE APPROPRIATE COMMUNICATION VEHICLES TO MEET OBJECTIVES

Once an agency has determined objectives, identified the interested parties who should be included, and begun to think about audience concerns, it is time to begin planning the best means for delivering the risk message to each group. While the tips presented here will help your agency, they are not intended to be a substitute for the advice and assistance available from public information specialists. Your staff's technical knowledge and knowledge about the public's concerns, are complemented by

communication skills of public information specialists in implementing the various communication vehicles available. Successful experiences of others, such as other air agencies who are undertaking similar objectives, can also be useful in selecting appropriate vehicles for risk messages.

As a starting point, agencies must plan for the specific communication formats that are required by State and local statutes. Typically, for air agencies concerned with air toxics, these include public hearings on proposed regulations, a public comment period for written comments on proposed regulations, and public meetings, if requested, on permit applications, if requested. In addition to legal requirements, consideration of the following factors[6] can be useful in choosing the most appropriate communication vehicle: communication objectives, resources available, lead time necessary, audience needs, degree of interaction needed, degree of controversy, distribution, and degree of detail necessary.

The suggested vehicles discussed in the following paragraphs will help agencies plan for early and thorough risk communication. These suggestions are divided, for discussion purposes, into oral and written formats.

Oral formats used in risk communication include advisory committee meetings, one-on-one conversations, contact with key individuals, meetings with particular groups, negotiating sessions, radio and television interviews, telephone hot lines, public meetings, informal workshops, and public hearings. Advantages and disadvantages, as well as when each vehicle is appropriate are discussed below.

<u>Advisory committee meetings</u> are a good way to involve representatives from a number of groups early in risk evaluation

and risk management, especially when communication objectives call for Power Sharing or the Consult 2 level of citizen participation (See Section 3.2.1.). Such committees can continue to function until a particular task is completed or can continue to function indefinitely as a source of public opinion on air issues. Committee members become familiar with air pollution control and risk assessment terminology, as well as the views of other, possibly opposing, groups. Committee members may also help the agency communicate risk messages to their respective groups, and, in that regard, advisory committees can enable an agency to work with a number of key groups. One disadvantage some agencies have experienced in using advisory groups is that committee members did not take material back to their group or speak for their groups. In essence, some committee members were acting as individuals when the air agency thought they were representing an important constituency. To avoid this problem, develop guidelines for advisory group representation and participation that require representatives to coordinate and receive input from their constituencies.

<u>One-on-one conversations</u>, where agency staff members at all levels of the organization discuss risk issues with people, will always be part of risk communication whether planned or not. For this reason, agencies must be ready for such discussions. Receptionists and field sampling technicians, for example, may be questioned by the public. Time should be allowed for conversations with individuals after workshops or public meetings. Some agencies have used "drop in" hours where staff members were available at locations such a public libraries to talk with people individually about risk issues. Because anyone in the agency may be a risk communicator, all staff should receive appropriate training and agency support. Risk communication must be emphasized as an important part of agency staff's jobs. As many have learned, unplanned or unintentional

communication even peripherally related to the risk issue can influence public opinion, for better or for worse.

Contact with key individuals such as community leaders, local elected officials, or leaders in environmental groups can be a good way to learn of public concerns and the information needs of the public. It can also help to get risk messages out to key groups. Ongoing contact with key people can help improve trust of the groups represented.

Meetings with particular groups (e.g., civic organizations, homeowners associations, etc.) are useful in identifying public concerns as well as improving public understanding of an agency's position on risk issues. While this form of communication is useful, agencies must be careful not to slight other groups that would like the same opportunity. If giving presentations at a number of these meetings, it may be useful to develop a standard format, even though the specific content may vary. For instance, plan to (1) describe the risk issue, (2) describe how it affects the public, (3) note what is being done about the risk, and (4) discuss how citizens can assist your agency. Adjust material and degree of complexity to meet the needs of the audience.

Depending on the audience and the nature of the presentation (e.g., an after-dinner talk, the main speaker for a workshop, etc.), carefully consider the speaking time constraints. One rule of thumb is to allow 20 minutes for such a presentation. Be sure to allow time for questions and answers, and if issues arise that cannot be addressed in the time allotted, give the audience a person to contact for more information. Schedule the meetings at convenient times for your audience, and consider evenings and weekends.

Presentations for such meetings require substantial effort to be effective. Prepare supporting material such as slides, graphics, and exhibits that will help convey the message. Practice the presentation in front of colleagues and consider pretesting it using the methods discussed previously.[14]

Small group meetings offer a good opportunity to exchange information with the public, answer questions, and clear up misunderstandings. They also help agencies understand citizen concerns and establish a rapport with the public.

The following is a list of steps for conducting small group meetings[14]:

* identify interested citizens and officials
* limit the audience to between 5 to 20 people, because people will be more candid in a smaller group and a smaller group is more conducive to establishing rapport. If more people are interested, schedule more small meetings.
* select a meeting date, time, and place conducive to good interaction
* set up the room (chairs and tables, AV equipment) to create an atmosphere for discussion
* follow an agenda, established before or during the meeting
* begin with an overview
* gear the discussion to the audience
* listen actively
* follow up on major concerns

One criticism of small group meetings sometimes raised is that the agency is trying to "divide and conquer" by telling different stories to different groups. Try to avoid this

criticism by holding small group meetings for all who would like to attend one and by either keeping a written record available of all meetings or inviting a cross section of interests to each meeting.

Negotiating sessions are a relatively new addition to agency public participation and risk communication strategies, in which key interest groups are part of a team which hammers out differences and prepares regulations that are acceptable to all groups. This type of rulemaking is designed to avoid controversy when rules are proposed since groups have reached a consensus before proposal. This strategy may be part of the formal rulemaking process or serve an advisory function.

Radio and televisions interviews reach a large heterogeneous audience and primarily inform the public rather than fostering public participation. Considerations for such interviews are discussed in Section 6.0.

Telephone hot lines allow anyone with a question to speak with a staff member from the air agency. Many agencies already have telephone hot lines for citizen complaints such as complaints about odors. Publicizing such hot lines helps to let the public know that the agency is interested in their concerns, and information on the concerns expressed by callers can be a useful part of risk communication. One disadvantage to this approach is that it is resource intensive.

Public meetings are large meetings open to the public, and may or may not be aimed at a specific group. Agency staff present information and the attendees have a chance to ask questions and offer comments. Public meetings work best when they are small and informal. Large public meetings do not encourage meaningful dialogue between the public and the agency, but rather are seen as an opportunity for citizens to take a

stand (usually against) the agency's action. As an alternative to a large public meeting, some agencies have divided large groups into small discussion groups. In any meeting, the agency should be clear about the goals of the meeting and the role of the public in the agency's process.

There are several steps to follow in holding a public meeting[14]:

* identify participants (possible speakers as well as attendees)
* prepare an agenda listing the issues to be covered or tasks to be completed and involve citizens in developing the agenda, if appropriate
* be sensitive to special needs of the public such as providing an interpreter for the deaf or translator for non-English speaking groups
* rehearse presentations
* announce the meeting two weeks in advance in local newspapers, broadcast media, and on flyers to interested groups
* hold the meeting in a comfortable setting
* if possible, hold the meeting under the sponsorship of an existing credible organization (e.g., city council, civic club, League of Women Voters)
* review the purpose and agenda at the beginning of the meeting and outline the organized process for speakers to sign up, speak, and have their comments recorded
* consider different meeting formats to encourage information exchange (e.g., have moderator circulate throughout the room to solicit comments, break up into smaller groups to address specific tasks)
* set up stations for different issues
* be prepared, when meeting on a volatile issue, to

address an angry audience; take security precautions
* prepare a transcript and make it available

Open technical meetings allow the public to see the risk assessment/risk management process in action. By hearing discussion on technical issues, uncertainties, and the associated give and take at such meetings, people may develop a better feeling for the regulatory process in general. Opening technical meetings, such as meetings of science advisory councils or risk assessment committees, can help to demystify risk numbers and enhance agency credibility.

Informal workshops are an important part of educating and informing audiences outside of potentially controversial situations. They can also serve as a valuable feedback loop for agency staff. Workshops are useful when risk communication goals call for a level of citizen participation beyond the "Inform Level." (See Section 3.2.1.)

Public hearings, while generally required by agency regulations, do not offer an opportunity for a productive exchange of ideas or joint problem solving. In fact, as designed, they are one-way, passive forms of communication. It is far more productive to communicate early and throughout the program development or permit review process than to wait for a formal public hearing. Where public hearings are required, agencies should not wait for these to be the only point of public involvement.

Written vehicles for risk messages include press releases, fact sheets and information brochures, press kits, and technical reports. Obviously, with written messages, unlike oral messages, agencies are not able to read their audiences' reaction as the audience receives the message. Advantages and disadvantages, as well as when each vehicle is appropriate are discussed below.

Press releases give an agency the opportunity to write a risk message for the general public and submit it to the press. Be aware, the message will likely be edited prior to publication. Also, since the press get hundreds of press releases, they may be overlooked. Guidelines for dealing with the media and establishing good relationships with reporters are discussed in Section 6.0.

Press kits including names and telephone numbers of experts and briefing materials (e.g., a glossary of terms, information on health effects and control techniques) on important risk issues give reporters the tools to understand risk assessment and risk management as they relate to the issues your agency is facing.[11]

Fact sheets and information brochures are brief reports written in clear, understandable language, including graphs or charts, if called for. Fact sheets can be targeted to specific or general audiences. They are often distributed at meetings in order to give people a written version of the material to be discussed as well as important background information.

In preparing fact sheets, decide at what points in the process they will be useful. For instance, development of air regulations for toxic pollutants can be a long process, including initial studies of the problem all the way through development of a control approach and promulgation of regulations. Different fact sheets could be useful at different points in this process. Some States have prepared fact sheets on their air quality permitting process in order to help the public understand the role of the agency and the public. States have also used fact sheets to describe a particular facility being considered for a permit, listing pollution controls used, predicted pollutant concentrations after controls, acceptable ambient levels adopted by the State for those pollutants, etc.[12]

Information presented on the fact sheet will be a function of the purpose and stage of public involvement. Fact sheets concerning permitting of a specific facility might include a brief background on the facility's location and function, a description of the reason it has applied for an air permit, the risk estimates for emissions from the facility, a description of the control measures that will be used to minimize risk, a timetable for the upcoming actions, and the name and address of an agency contact working on this permit application. One State agency that routinely holds public meetings on air toxics permit applications has prepared a fact sheet on the agency's permitting process and air toxics program which is used at such meetings along with a fact sheet specifically prepared for the particular facility.

Fact sheets take time to prepare and require coordination between the technical and public information staff. Fact sheets are a one-way communication tool, and therefore should always give the name, address, and telephone number of an agency contact person.

Well-designed fact sheets are easily read. People will be more likely to read a fact sheet that has been typeset, broken into short paragraphs with clear, easy-to-read illustrations, than one that is a solid sheet of typed text. In addition, a well-designed fact sheet suggests that the agency is taking its risk communication program seriously.

Fact sheets are effective when resources do not allow more in-person communications, but agencies should still provide additional information to concerned and interested individuals.

Technical reports are often produced to give the results of technical efforts such as risk assessments, review of pollutants that should be controlled in a State, and selection of acceptable

ambient levels for consideration. While such reports are not usually written for the general public, some audiences will be willing and able to read, digest, and comment on this type of material, and, therefore, such reports should be made available to them.

3.7 DEVELOP A RISK COMMUNICATION EVALUATION PROGRAM

As agencies begin to put risk communication principles into practice, communication efforts can be improved by feedback. In planning for risk communication, it is important to plan and prepare for evaluating communication efforts. Evaluation methods can be categorized as follows: audience analysis, message pretesting, assessment of communicator style, and outcome assessment. Some of these methods are used before wide dissemination of your message and others are techniques that follow delivery of risk messages.[13]

Audience analysis tools help agencies to understand the perceptions of the audiences and to solicit feedback from key audiences before, during, and after a communication program. Such analyses can include discussions by agency staff of predicted audience positions, gathering questions from the various publics in advance of meetings, analyzing news clippings, public opinion polling, and qualitative questionnaires.

Message pretesting allows agencies to get feedback on written materials before such materials are printed and distributed, and to have others critique oral presentations before delivery to the main audience. Message pretesting can include surveys and questionnaires, discussion groups (e.g., focus groups, see Section 3.4.2), and reviews of language used in the materials. It can range from a review or test of newsletters, video tapes, etc. to holding dry runs for public meetings.

Indeed, through pretesting, agencies can assess whether the material is too complicated for the intended audiences, whether it addresses barriers to understanding, whether jargon is excessive, and other aspects of the style and content. Messages should be geared to the audience, not to the air agency staff.

Message pretesting can be as simple as trying out written material or an oral presentation on other State employees or staff members' families. Some types of message pretesting techniques described by Kline, et al[13] require more lead time, more staff time, and more money to implement. These include self-administered pretest questionnaires, central location intercept interviews, theater testing, and focus groups. Pretest questionnaires are given to a representative group to complete after they have reviewed the material being tested. Such questionnaires include questions on format, comprehension, source credibility reaction, and interest in the materials.

Focus groups were discussed in Section 3.4.2 in regard to identifying public concerns prior to developing risk messages. Focus groups are also useful in testing risk messages. In pretesting risk messages, a focus group would be discussing a particular message presented in a draft brochure, fact sheet, news release, etc.

While formal focus groups give the best results, agency staff may feel they do not have the time or funds to use this technique. At a minimum, agencies can create pseudo focus groups or pretest groups by giving messages to family members, friends, and other associates outside the field of air pollution control of the air agency. These "outside" opinions can be an initial indicator of how well the message might be received. Ask for feedback, but do not tell them the purpose of the communication up front. See what they think the message is and try to

ascertain the questions and concerns they had in their review. This approach is not as systematic as formal focus groups, but it is a quick way of testing a risk message when there are time and money constraints.

Assessments of communicator style help agency spokesmen to realize what attitudes and strengths they bring to risk communication. Most of these tools are self-assessment surveys that are completed and then scored, providing a profile of the respondent's style, type, and/or motivational pattern. Agency speakers have, typically, focused on scientific facts. Such a focus, since it may not be the same as the audience's, can lead to impasses in communication, alienation of the audience, or the appearance of evasiveness. It can give the audience the impression that the agency does not understand or is avoiding their concerns by confusing them with numbers.

Outcome analysis examines communicator performance and audience reaction. Tools include meeting reaction forms for participants in public meetings; verbal meeting feedback, speech evaluation checklists, and observation and debriefing.

One type of meeting reaction form, completed by participants at the end of a meeting, consists of a series of statements which participants rank on a scale of 1-5 (strongly agree to disagree entirely). The statements examine whether the audience understood the information presented, if the presenters were perceived as honest, whether the people felt that their concerns and issues were understood, whether people perceived that their input would be used in decision-making, what their conclusions were, and other issues. Respondents also can note what they liked most and least about the meeting.

Scheduling time at the end of a meeting to solicit verbal feedback is a way to quickly obtain feedback on that particular

meeting. Allow five to fifteen minutes at the end of the meeting for structured brainstorming. This time should be announced at the beginning of the meeting along with the agenda so that people will be prepared to give their feedback. Participants are asked to brainstorm (i.e., quickly offer ideas which are recorded and not judged or discussed in depth) about what were the positive aspects of the meeting, what were the problems, and what could be changed to improve the meeting. Comments on all aspects of the meeting are welcomed. This technique works best when the person soliciting feedback refrains from acting defensively and keeps the brainstorm moving.

In addition to the audience reaction evaluation techniques, two performance presentation evaluation methods are a speech evaluation checklist, and observation and debriefing. A speech evaluation checklist is simply a one-page checklist with room for additional comments which can be completed by any number of evaluators who view the speech during trial runs or an actual presentation. The checklist addresses the physical setting, speaker's appearance, degree of rapport, topics covered, the exchange of ideas between the speaker and the audience, and the audience's reaction.

Observation and debriefing is a similar technique for evaluating oral presentations. Observations of the presentation by one or more people are recorded and communicated to the presenter. Observers may use checklists based on the speaker's goals for the presentation. Feedback given to the speaker should include the speaker's performance as well as the audience's reaction. Designated observers are also useful for small group work sessions where a meeting is divided into smaller groups for discussions of particular topics.[14]

3.8 PUTTING IT ALL TOGETHER

Objectives, audiences, concerns, communication channels - it is difficult to visualize putting it all together in a plan. You may find it useful to develop a planning form such as the one presented in Figure 1, or to use the planning checklists developed by Chess, et al.[2]

Two of the most commonly cited barriers to having a strong risk communication program are time and money constraints. This lack of resources, while real, is sometimes used as the rationale for not undertaking any efforts toward risk communication. As a result, most efforts are reactive ("contain the damage") and little time is put into the up front planning or more proactive activities.

Figure 1. Risk Communication Public Involvement Planning Form

Communication Objective:

Audience:

Main Message:

Communication Channel:

Risk communication planning and ongoing active efforts to involve the public are actually more cost-effective than the energy, time, and money it takes to "fix" or minimize risk communication problems. Not unlike the environmental problems agencies must manage, preventing a problem is usually less costly than trying to mitigate or correct one. To that end, the following suggestions are aimed at agencies that desire better risk communication. These items require relatively little time and funding, but do require initiative and creativity.

1. **Listen to the public at every opportunity.** Talk is not always cheap, but listening can be! If there is not the time or staff resources to conduct focus groups or hold a series of community meetings, then consider mailing out easy surveys (i.e., limited questions with possible choices identified).

2. **Review newspaper articles and other press coverage.** Look for the underlying concerns, not just the inaccuracies. This is relatively quick to do, and, since most agencies already have a news clipping service, requires no extra cost.

3. **Hold informal focus groups within the agency to pretest your risk messages.** Get people without program or technical experience to look at press releases, summary reports, fact sheets, etc. If "nonexpert" staff have difficulty with the material, you can assume the general public will. Think of creating an inter- and intra-agency ad hoc focus group. Many agencies find this useful and if done on a volunteer basis, it avoids the turf battle issues.

4. **Get the public information/awareness program office to prepare a series of brief, easy to understand pamphlets.** If such pamphlets are too expensive for the agency, see what is available (e.g., EPA brochures) on risk assessment and exposure assessment.

Have program offices develop a "lay" dictionary of risk assessment and air permitting terminology. These do require some investment of staff time, but the benefit far outweighs the minimal investment. These items can be used for a wide variety of purposes extending their usefulness.

5. **In the event of some "incident" or major issue of public concern, designate telephone time slots for citizens (and the press) to call in with questions or concerns.** If you develop a list of potential questions and responses to those questions, then several people can answer calls. This can have a large positive impact on the agency's credibility and perceived willingness to be open and honest.

6. **Have dry runs for all public meetings and hearings.** Require staff to practice their prepared talks, but spend as much if not more time on responding to anticipated questions. Be sure to answer the tough questions.

7. **Train staff members.** Everyone is potentially a risk communicator. Training programs are relatively inexpensive and can be accomplished in one to two days. Training is often the key to heightening sensitivity and encouraging an ethic of effective risk communication.

8. **Listen, acknowledge feelings, and respond in ways that show care and concern.** There is really no substitute for effective risk communication other than good communication skills.

9. **Use internal technical and public relations staff to identify all issues and attempt to provide information to people in advance,** especially on issues outside of air agencies' control (property value, traffic lights, zoning, etc.).

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4.0 EXPLAINING ENVIRONMENTAL RISK INFORMATION

In permitting new sources or in modifying existing permits to allow for source expansion or other changes, both State air agencies and the industrial facility may be asked questions regarding the risk of the proposed emissions. Typically, these questions may be posed in the following manner:

* Will my family and I be safe if we breath these emissions?

* Will the emissions affect my health, my family's health, or my pet's health?

* Will the emissions cause any harm to the environment (fish, lakes, ponds, plants, vegetable gardens, etc.)?

* How certain are you?

Through such questions, people are trying to answer the micro risk questions of, "Am I safe?" and, "What level is safe?". Underlying these overt questions will be further concerns regarding the need for certainty and the public's intuitive need to know, "What is the worst that could happen?"

This section gives suggestions to agencies on how to prepare risk messages. In communicating risks associated with toxic air pollutants, the air agency will be the major source of risk information. As the permittees, industry clearly plays a major role in risk communication. Some industry representatives have recognized the importance of this role and prepared training materials for their managers. (For example, see the Chemical Manufacturers Association material cited in Reference 3.)

Often States are placed in the position of objective reviewer of industry risk assessments and can be potentially perceived by the public as the "advocate" or "initiator." In fact, both the State and industry are important and necessary sources of scientific risk information. As such, both groups need to be willing to undertake proactive risk communication programs. The State and industry risk communicators do not necessarily need a coordinated script; especially at public meetings and hearings, however, each party should be aware of the role the other plays. The agency staff should let industry know that they will be critical in public if they need to be because they are critical objective technical reviewers.

The air agency staff has the responsibility to involve the public. Staff members need to carefully evaluate information to structure meaningful messages to their various audiences. Clear, complete technical information is very important to getting the message across, but it is not the only important part.

Key for structuring successful risk messages is recognizing that there are two major parts. First is responding to information needs, concerns, and perceptions of your audience; understanding these needs requires active listening. The second part is conveying accurate technical information clearly. Risk managers often focus primarily on the technical information they feel is necessary and wish to communicate. They may be willing to respond to questions, but, mistakenly, do not incorporate public concerns into their message. Two-way communication and dialogue, which are closely associated with credibility, will not occur unless the concerns of various audiences are addressed in any message concerning risk.

All of this information is important in risk messages. This chapter focuses on considering and respecting public perceptions of risk (Section 4.1), aiming risk messages at your target

audience (Section 4.2), explaining technical information (Section 4.3), explaining information about the nature of the risks and the uncertainties (Section 4.4), determining risk acceptability (Section 4.5), using visual presentation (Section 4.6), and personalizing risk information (Section 4.6).

4.1 CONSIDER PUBLIC PERCEPTION OF RISK AND OUTRAGE FACTORS

Once target audiences and their concerns have been identified (Section 3.0) and the information that an agency feels the public must know has been gathered, attention can be focused on structuring risk messages in such a way as to avoid outrage, and therefore improve the quality of communication. Hance, et al[1] developed five tips for avoiding outrage:

1. **"Consider the outrage factors when explaining risk."** Outrage factors were described in Section 3.4.1. In order to avoid upsetting people (i.e., causing outrage), you must understand what is upsetting to them. Making risk comparisons, for instance, can lead to outrage when comparing voluntary and involuntary risks (e.g., comparison of risks from smoking with risks posed by toxic emissions from a factory). Risk comparisons are discussed in more detail in Section 4.3.3.

Communities are more likely to base decisions about risk on the procedural process used by the agency to make risk decisions than on the technical aspects of the risk. Further, public perception of risk is more likely to be accurate if the agency is open in its communication, and involves the public in risk decisions. This means air agencies should develop understandable messages that explain their decision-making process and criteria for determining "risks." This should occur prior to messages explaining "risks" associated with a particular permit or facility, or a particular approach to controlling air toxics.

2. **"Be prepared to give people's concerns as much emphasis as your numbers."** Both are valid and important to good risk management. Let people know that you are interested in their fears and concerns. Health matters raise strong fears, concerns, and emotions. Communities want to know numbers, but it is wise to address values and feelings first. For example, it may be useful to begin a presentation by saying, "I know from talking with some of you that you are very concerned about protecting the health of people in this community." Addressing values and feelings may require providing different messages in different ways and always requires active, compassionate listening and response.

3. **"Be forthcoming with information about the situation from the outset."** Agencies should be aware that if the public perceives that an agency is withholding information, or is not releasing information in a timely way, the public will lose trust in that agency. That fact should be considered when deciding whether to withhold or delay release of information.

4. **"Be sensitive to related issues that may be more important to people than the risk itself. Expect different people to see the risk differently."** In communication that centers around a permit for a specific facility, local officials may be concerned about attracting and keeping that and other industries; employees may be concerned about keeping their jobs in light of potentially expensive control measures; and nearby residents may be concerned about the health effects, as well as about property values. Communication with each group should identify and address these relevant concerns.

4.2 AIM MESSAGES AT SPECIFIC TARGET AUDIENCES

The previous section noted that different groups see risks differently and risk messages should reflect this in that they

must be prepared with the receiver group in mind. Before preparing a risk message for a particular group, consider what that audience already knows, what they want to know, and what the air agency feels it is necessary for the audience to know.[1] Contact with the key groups (Sections 3.3 and 3.4) will help clarify what groups want to know and their current level of understanding. Never be condescending, regardless of the audience's level of education.

Ideally, risk messages require several formats of different lengths, levels of complexity and levels of generalization, tailored to meet the needs of the different audiences and specific media. This is not always possible; often the same message goes to all audiences, which may include physicians, educators, and scientists, as well as less educated groups. Meeting the needs of such diverse groups simultaneously requires careful, thoughtful planning and recognition that these needs will change during the process.

Cultural background, shared interests, concerns and fears, previous history, social attitudes, and facility with language are all important audience attributes to consider. Sociological factors can influence such things as how people view authority (e.g., the air agency), how they relate to their environment, and how they view their jobs. These and similar factors will influence how people with certain cultural backgrounds and social attitudes will perceive risk messages.

For example, the New Bedford Harbor Superfund Site in New Bedford, Massachusetts involves a multicultural population which includes a large Portuguese-speaking population. In developing a community relations program for this site and preparing risk messages, it was crucial to address language and cultural differences. In discussion with groups in New Bedford, it became

apparent that effects on fish were important because fishing was an important part of the livelihood of many people there and fish was a significant part of the diet.

As a result of these factors, EPA had some material translated into Portuguese and had a Portuguese translator present at public meetings. In addition, to address the issue of safety of fish consumption and economic viability of the fishing industry, risk messages were prepared to convey that only a limited number of fish were examined and, that while part of the harbor waters were contaminated warranting a fishing ban, it was unlikely that the entire area was contaminated. EPA wanted to convey that its risk assessment process supported a clean-up of part of the harbor area in order to return the fishing resource.

People with particular viewpoints or concerns may have joined organized groups who share the same interests. Some of these groups include hunting and fishing clubs or other recreation organizations, school parent-teacher organizations, homeowners associations, and environmental groups, for example. In each case, the group's primary interest - quality recreation, children's well being, property and quality of neighborhood life, or environmental quality - will give you clues about concerns to address in risk messages.

Present risk messages in language appropriate to the audience. Use material the groups will understand, including graphics. If speaking to a group with diverse language skills, it may be best to present information in a simple way at the beginning, build in complexity, and summarize in simple language that can be understood by the entire group. It is wise to avoid losing people early with an overly complex message, and it is unlikely that initial simplification will cause a loss of interest. In an oral presentation to a diverse group, those people who may not have the vocabulary to understand the message

may be reluctant to ask questions, and the spokesman will need to rely on observations of facial expressions, and the like to know if the message has been understood.

4.3 MAKE SURE TECHNICAL INFORMATION IS PRESENTED CLEARLY

Authorities on risk communication agree that agencies should never underestimate the capacity of citizens to understand technical aspects of risk issues. Indeed, some people are willing to work hard at synthesizing technical information. Some simplification of information is necessary, but when information is simplified, key pieces are often left out, making it difficult for the public to understand the situation fully enough to make informed judgments. Herein lies the challenge to government agencies.[3]

There is a distinction between simplifying the language and simplifying the content of the risk message. Simplifying the language in such a way that you use plain English rather than technical jargon is always appropriate, but you must take care to convey the whole issue when simplifying the content. In some cases, it may be useful to teach people the meaning of certain technical terms they are likely to hear. This then allows the risk communicator to then use some important and precise technical terms and prepares the audience to understand media stories, or other sources, using those terms.

Risk messages will be much more understandable if you avoid two temptations: do not use acronyms and do not use jargon. One guideline is to explain the subject to the public as you would to an intelligent, but uninformed, friend.[3] Below is an example of a risk statement, complete with jargon and acronyms, followed by the same message restated without technical jargon or acronyms:

The DEP's linearized multistage model provided an estimate of the 95 percent lower confidence level of the average daily dose associated with a lifetime cancer risk of 1×10^{-6}.

More simply stated, this becomes:

Our State air agency estimated the risk of getting cancer if people were exposed to a certain level of this chemical in the air. Our highest estimate of the cancer risk from chemical x in the quantity released from the Y Plant is one chance in one million. In other words, in a city of 1,000,000 people, we would estimate as a worse case, that at most one person may develop cancer from exposure to this chemical over a lifetime. In other words, this one cancer is an addition to the 200,000 to 250,000 cancer cases that will occur over a lifetime without exposure to this chemical . . . In fact, because we've used a worse case, it's conceivable that there would be no additional cancers due to this chemical. The reason that our estimate of excess cancer ranges from zero to one is that we've used some very health protective assumptions in our calculations to insure that we are fully protecting your health.

Statistics show that we can expect 25 percent of the people to get cancer from all causes. Our study of Plant Y indicates that one additional case of cancer would result in the city of 1,000,000 people all exposed to chemical x throughout their lifetime.

In making this risk estimate, we have to use some assumptions. In this case, we assumed that people would be exposed to the same quantity of the chemical 24 hours per day for their entire lifetime of 70 years. It is unlikely that people would be exposed to this much for this long, but we make these assumptions to assure that your health is protected even from the worst possible case.

When simplifying the content of the risk message, consider which information is most important to convey, but do not equate condensing information with making it more understandable. Also, continue to be prepared for technical questions. (In the above example, the linearized multistage model was not explained, but a speaker would have been prepared with an explanation of mathematical modeling if called for.) Some people will want to know only if the agency has taken necessary steps to make their

environment safe, while others will say that they want to know everything.

One guide on this matter is to include in the message: (1) the facts the air agency wants people to understand, (2) the necessary background to understand the facts presented, (3) additional background needed to avoid potential misinterpretations, and (4) answers to the public's questions and responses to their concerns.[3] In reality, this last point really needs to be the first part of the risk message or people will not hear the rest of the message.

Facts the air agency wants people to understand may include: (1) information about the nature of the risk, including the hazard of concern, probability and distribution of exposure, probability of harm from a given exposure, sensitivities of different populations, interaction with other hazards, qualities of the hazard, and total population risk; and (2) uncertainties in knowledge about risks, such as data weaknesses, assumptions, sensitivity of risk estimates and decisions to changes in assumptions, results of other risk assessments and why they differ.

Air agency staff face several difficulties in attempting to present and explain risk information. The subject of air toxics and, in particular, the risk from air toxics versus criteria air pollutants is a "new" subject for the public. This means that it will be critical for agencies to structure risk messages regarding a specific facility's emissions or permit to provide sufficient background information. For example, the public may not be able to differentiate between short-term acute health effects and long-term chronic impacts. Concepts such as continuous release and instantaneous release, vapor phase and particulate matter, and dispersion must be placed in context

before responding to specific health concerns. One useful source of definitions for a wide variety of technical terms is found in reference 4, listed at the end of this chapter.

Other useful background information includes: (1) information about the nature of the benefits, including benefits and probabilities of those benefits associated with the risk, and recipients of the benefits; (2) information on alternatives, including the alternatives to the risk in question, and effectiveness, risks, benefits, and costs of alternatives; (3) information on levels of exposure elsewhere in comparable air circumstances; and (4) information on management, addressing who is responsible for the decision, which issues have legal importance, constraints on the decision, and resources available.

Fact sheets and information pamphlets, informal meetings, workshops, videotapes, appearances on local television, etc., are some of the vehicles that could be used as part of your agency's overall risk communication plan. Once terminology has been established and basic concepts have been described, it is possible to begin the more difficult task of describing the results of an exposure and risk assessment. Remember that it is not necessary to communicate all details - - keep it understandable. Focus on issues such as pollutants of concern, modeling results (8-hour average, 24-hour average, and maximum concentration); exposure at nearest receptors and critical receptors (e.g., schools, nursing homes); key differences and explanations focusing on hazard versus exposure; and carcinogenic and noncarcinogenic risks (i.e., calculation of exposure, dose, and risk estimates).

It becomes apparent that, if one were forced to provide all this detail in a single fact sheet, the message would get quite long and complicated. The solution is to provide sufficient background information throughout the permitting or regulatory

development process. One example of an effective communication strategy is to hold a series of mini public workshops and prepare simple fact sheets on a number of topics, including types of sources, characteristics of emissions, and dispersion and dispersion modeling.

4.3.1 Explaining Risk Numbers, Statistics, and Magnitudes

Risk assessments use and produce a great many numbers - levels of risk, concentrations, probabilities, levels of exposure, etc. A particular risk can be presented a number of ways, each producing a different impact or impression on the receiver. Covello, et al,[3] developed 10 guidelines for providing and explaining risk-related numbers:

1. **Carefully select the risk-related numbers and statistics that should be presented.** Do not pass on to the public the data you have in the form you received it. Choose numbers that illustrate the key points and respond to citizen concerns. Explain in narrative form what the numbers mean. Again, this may require efforts on the air agency's part to discuss such topics as threshold versus nonthreshold chemicals, and how and why the agency develops two very different risk estimates for these chemicals.

2. **Choose a risk number for which valid data are available.** If the only data available are on death and not other health effects, such as reproductive effects, discuss the data available. If people are concerned about issues for which there is little data, be prepared to talk about what data are available and what the agency will do to investigate their concerns.

3. **Whole number and simple fractions are preferable.** It is better to use 6 parts per billion rather than 0.006 parts

per million. However, when comparing several values, it is best to express them all with the same denominator (e.g., for three chemicals, the risk per million people exposed is 3.0, 0.6, and 4000.0, respectively).

4. Choose a number that the audience can easily understand. Avoid unfamiliar units or overly complex concepts. Use words that help clarify the meaning of the number. Units of measure such as "parts per billion" or "one in one hundred thousand" can be difficult to comprehend. Good explanations and analogies help people visualize such abstract concepts. For example, one part per billion is equivalent to one second in 32 years or one drop in 100 Olympic-sized swimming pools. A lifetime risk of 1×10^{-5}, one in 100,000, can be illustrated as, "If a large football stadium (capacity 100,000 people) were filled with the same people for 70 years, one additional person would be expected to get cancer, over the 25 percent that national health statistics show us are likely to get cancer."

In using these types of clarifying statements, care must be taken to avoid making the issue sound trivial. When using analogies to explain units of measure such as parts per billion, do not use humorous or trivial comparisons such as one square of toilet paper in a very large number of rolls. In addition, point out that some toxic chemicals present significant health concerns in such small amounts.

5. Visual aids, such as graphs and charts, will help to present and clarify risk numbers. Visual presentations can be quite useful in explaining technical information (e.g., dispersion and exposure pathways), but they must be carefully prepared and should not be the sole source of information. Assess whether the audience is able to understand graphs. When planning presentations, select the most effective format (e.g.,

slides, graphs, charts, photographs, drawings,etc.) and content. Do not present too much information in each visual aid; one rule of thumb is to limit information to one main idea and, for slides, no more than 15 words.

6. Present a number that is fair and relevant, that is to say, reflects the true magnitude of the risk and speaks to the issue at hand. For instance, if the audience is a group of homeowners near the a particular plant that has applied for a permit, it is relevant to discuss risk at the plant fenceline. However, when preparing a message for a statewide audience, it is more relevant to discuss risk over a wider area.

7. Present a number that the audience will consider fair and relevant. Address health effects the audience is concerned with. If the agency knows in advance that the audience will not believe that certain numerical estimates are credible, do not present these estimates. This may mean discussing numbers and estimates developed by outside sources (e.g., the facility, activist groups, etc.)

8. Make presentations clear and comprehensible, but do not oversimplify. When motivated, most people are capable of understanding technical information. Provide opportunities for those people to obtain more detail when they want it.

9. If other groups are presenting risk numbers, pay attention to their numbers. It can be very confusing if different groups are using different numbers. Address this directly, and explain why the numbers are different. This issue should be discussed prior to a public meeting forum, otherwise the credibility of the agency and its estimates can easily be called into question. One way to explain the difference is to talk about how the numbers were calculated and the assumptions used. Rather than try to convince people that the agency's

number is "better" or "the right one," focus on helping people understand the approach and rationale for the assumptions used.

For example, an environmental group may want to calculate risk at the fenceline assuming an individual is exposed to the highest concentration for 24 hours per day. Conversely, the industry might select exposure conditions it feels are more representative of the entire exposed population. It is important to present key exposure assumptions and conditions to the public when explaining risk estimates. Only in this way can they make informed decisions regarding which numbers they believe are credible. This concept is discussed further in the next section.

10. Consider offering several estimates of the same risk number (e.g., the most likely estimate, the worst case estimate, an estimate developed by another group).

4.3.2 Effective Use of Exposure Information

Since risk, as technically defined, is a product of hazard and exposure, estimation of exposure is a key part of any risk assessment. The public needs to understand the basic concept that for a toxic chemical to pose a risk, there must be a way for the chemical to get from a source to people.

Concrete images give substance to abstract risk concepts.[3] One example used to explain the concept that exposure must occur before there can be risk was to compare the presence of a bottle of poison in a room with a child. If the poison was in a child-resistent bottle, clearly labeled and locked in a safe, there is little chance of exposure to the child. On the other hand, if the poison was left in a brightly colored dish on a coffee table, the likelihood of exposure increases dramatically.

Exposure introduces its own layers of uncertainty -- atmospheric transformation, metabolic processes within the body, the quantity that actually reaches individuals, human activity patterns, dispersion modeling assumptions, etc.[2]. Amid these complexities, the author of risk messages for the public must decide what the public needs to know to make a well-founded decision.

It is also important to explain what exposure estimates are based on, that pollutant concentrations are not the same at all points and do not remain the same at any one point, and that different individuals will respond differently to the same exposure. Experience has shown that concepts such as dispersion in space and time can be difficult for people to understand.[5]

Some agencies have noticed confusion on the part of the public about how estimates of ambient concentrations and exposure are developed. People often do not realize that these are estimates, rather than facts. With regard to ambient concentrations, it may be necessary to explain that to estimate approximately how much of a pollutant the public is exposed to, agencies first need to know how much is released from the source. To determine this, agencies may sample the pollutant as it is released from the specific source in question, or they may use average emission measurements that are made by sampling emissions at a few "typical" sources. Once the agency learns how much is emitted from the source and what hours the source operates, the agency combines this information with the worst-case weather conditions and the nature of the chemical, and estimates what the average concentrations will be in the air around the source over a certain time period. The estimates are made by a computer model that is really a set of mathematical calculations, developed by scientists, that consider how pollutants spread out and where they go when they are released. Ambient concentrations

are different at different points, depending on factors such as distance from the source and weather conditions.

Similarly, agencies may need to explain that exposure estimates take the ambient concentrations at points around the source and estimate the number of people that would be exposed at each point. Information on the number of people can come from census data, county records on property ownership, or more detailed surveys.

One important concept is that risks can be expressed in different ways by using different levels of exposure. For instance, 70 years at the plant gate is associated with one risk level, while 70 years 5 miles from the plant is associated with a lower risk estimate. Seventy years at the point of the highest estimated exposure level is likely associated with the highest individual risk estimate.[3]

4.3.3 Careful Use of Risk Comparisons

While risk comparisons are important and very useful for putting risks into perspective for people, they are also one part of a risk message that can invoke significant feelings. The first step in developing a comparison is to clearly understand why a comparison needs to be made. Risk comparisons may be used to clarify statements. They may be intended to reassure people that a certain risk is small, or to convey that a particular risk is quite significant.[3] Comparisons are useful in a risk message in the following four situations:[2]

1. To help people visualize a process or quantity,
2. To help people understand probabilities,
3. To directly compare alternatives, and
4. To gauge the relative importance of different causes of the same hazard.

It is important, when using comparisons, to avoid comparisons that ignore the outrage factors and comparisons that minimize or trivialize risk. Section 3.4.1 lists outrage factors. Comparisons between risks posed by toxic emissions and risks that citizens accept everyday will not be useful, and, in fact, are likely to invoke outrage because they do not acknowledge the outrage that people are feeling and they show a lack of concern. For example, when EPA was presenting information workshops on arsenic emissions from the copper smelter in Tacoma, Washington, a slide was used comparing cancer risk from exposure to airborne arsenic with cancer risk from drinking diet soda. This comparison invoked sharp responses from the audience because it compared a voluntary risk, drinking soda, with an involuntary risk, being exposed to arsenic, and implied that if a person accepts one risk, he should accept the other.[1] Comparisons that minimize or trivialize risk, rather than putting it into perspective, tend to make people suspicious. Using a comparison to a little-known hazard that people accept routinely (e.g., eating peanut butter or bicycling) will strike the public as an effort to trivialize risk, no matter what data are presented. Similarly, comparisons used to put units in perspective can trivialize risk, if not framed carefully. For example, comparing one part per billion of a chemical to one sheet of toilet paper in a roll stretching from New York to England errs in that it assumes that a low concentration means a low risk and in that it trivializes the risk and sounds contemptuous of citizen concerns.[1] On the other hand, if prefaced with a statement that the comparison is only to help visualize the number, and followed by a statement that some exposures in such small quantities can be quite hazardous, then such comparisons can be useful.

In using comparisons, compare similar situations or substances. Examples of comparisons of similar factors include:

comparisons with risk levels before and after control, and comparisons of ambient concentrations with ambient standards from other States or with ambient levels in other areas.[1]

These points can be illustrated by ranking different types of risk comparisons based on their acceptability to the public. The highest ranking comparisons strike people as relevant, appropriate, and helpful, while the lowest ranking comparisons can seem manipulative or misleading. This risk comparison ranking system of Covello, et al[3] is summarized below:

<u>First Rank Comparisons</u> (most preferable)

* comparisons of the same risk at two different times, for example, before and after installation of a control device or initiation of a new procedure
* comparisons with a standard, such as allowable ambient concentrations of other States
* comparisons with different estimates of the same risk, for example, our most likely estimate versus the estimate under the worst case conditions, or estimates based on different estimating methodologies

<u>Second Rank Comparisons</u>

* comparisons of the risk of doing something with not doing it, for instance, if the most stringent control requirements are imposed the risk is x, while if not, the risk is y.
* comparisons of alternative solutions to the same problem, such as the comparison of risk if technology-based regulations are used versus an

acceptable ambient concentration approach

* comparisons with the same risk as experienced in other places, for instance, City x has y level of a certain air toxic, the highest recorded level in the U.S., while our city has one tenth that level.

Third Rank Comparisons

* comparisons of average risk with peak risk at a particular time or location, such as the risk from a particular air toxic is 90 per cent less at the nearest home than at the plant gate, and the risk two miles from the plant is 75 per cent less than at the nearest home; or the risk posed under inversion conditions is 50 per cent greater than the risk posed by the same level of emissions under more favorable weather conditions
* comparisons of the risk from one source of a particular adverse effect with the risk from all sources of that same effect, as in the statement, "the risk of lung cancer from toxic air pollutant x is approximately three-hundredths of one percent of our city's total lung cancer risk." Take care with this type of comparison that you do not trivialize the risk.

Fourth Rank Comparisons

* comparisons of risk with cost, or of one cost/risk ratio with another cost/risk ratio. This is illustrated by the statements, "To reduce the risk posed by air toxic x by half would cost y dollars," and, "Saving one life by

controlling emissions of air toxic x would cost y dollars, whereas saving a life by improving particulate control would cost z dollars."

* comparisons of risk with benefit, such as the risk posed by emissions from a particular proposed facility would be x, yet the increased tax revenue would be y dollars.
* comparisons of occupational risks with environmental risks, such as, "The public is exposed to far less of air toxic x than the plant workers, and the plant records show no evidence of adverse health effects."
* comparisons with other risks from the same source, for example, stating that the risk posed by emissions of x is greater than the risk posed by emissions of y, and that the y risk has been accepted by the public.
* comparisons with other specific causes of the same disease, illness, or injury, as in the statement, "Air toxic x poses less risk to lung cancer than does exposure to natural background levels of geological radon."

<u>Fifth Rank Comparisons</u> (the last choice, rarely acceptable)

* comparisons of two or more unrelated risks, such as comparing risks from toxic emissions to the risk posed by driving a car or smoking
* comparisons of unrelated risks involving a familiar activity that people do not see as risky. Eating peanut butter, which people may not be aware can contain aflatoxin, is one such familiar activity.

Warnings about using risk comparisons are not meant to

eliminate the use of comparisons, but only to stress that they should be used carefully and with much forethought. At best, comparisons can help an audience visualize an abstract number, process, or hazard. At worst, they can alienate an audience and affect the credibility of the presenter. When using any comparison, it may be helpful to "test" the message before delivering it to the audience. This is where focus groups and other message pretesting techniques (Section 3.7) are useful.

4.4 ACKNOWLEDGE UNCERTAINTY

Risk messages prepared for the public should acknowledge uncertainty, but care must be taken to maintain public confidence. Scientists are accustomed to dealing with uncertainty, yet it can be difficult to explain these uncertainties to the public, especially because it is a human trait to desire assurance. This desire for certainty is present especially in the face of outrage or feelings of helplessness. For those with primarily technical backgrounds, the issue of uncertainty and how to present it can be quite challenging. Try to balance explaining uncertainty versus just listing all of the underlying uncertainties. Create a context of what the agency knows within what is scientifically known; that is, that the agency is as certain as possible given the state of the art technology or assessment method. Again, uncertainty can be quite confusing to the public and can cause concern especially when there are disagreements among "experts." Those preparing risk messages should place themselves in the public's position, trying to imagine what the public feels regarding uncertainty.

Types of uncertainty that should be conveyed to the public include: (1) scientific uncertainty, acknowledging that science is never 100 percent certain; (2) the inexact nature of the risk assessment process (e.g., a person does not remain at one place

for 70 years); (3) the incompleteness of the information that agency has gathered; (4) differences of opinion with regard to policy, that is to say, differences concerning implications of the information and the optimum risk management option.[1]

Hance, et al[1] offer seven tips on dealing with uncertainty:

1. **Acknowledge uncertainty.** Be aware that agency experts have a natural tendency to feel that they should have all of the answers, and to be defensive when they do not. Rather than trying to cover up what you are unsure of, try to explain uncertainties before you are confronted with them.

2. **Give people background about scientific uncertainties.** People need to understand the risk assessment process so they will understand that uncertainty is an inherent part of the process. Such an explanation will help people to understand how a risk estimate can be based on the best scientific data available, yet still be uncertain. Since the risk estimate will be more sensitive to choices of certain assumptions, the risk messages should state which assumptions were used, why they were selected, and what difference they make in the risk estimate.[2]

If, in the example given in Section 4.3, a point of policy disagreement hinged on the selection of a dose-response model, it would be useful to explain the concept of mathematical modeling:

> The model we used is essentially an mathematical equation or formula that is based on what we know about this chemical. The equation shows that the cancer risk depends on how much of the chemical a person (or laboratory animal) is exposed to. (Information on the effects of chemicals is often based on tests conducted on laboratory animals.) There are different equations that can be used to predict the risk. Scientists do not always agree on which equation - which model - is best to use. That is the case here. We chose this particular model because it tends to estimate risks

conservatively, from a public health standpoint. If the calculation of the risk should be in error, we would prefer to err on the side of safety.

3. **Be specific about what you are doing to find the answers.** You do not want people to equate your statement of, "I don't know," with, "I don't care," or, "I am incompetent." Explain the process; let people know what has been done, is being done, and will be done to do to resolve uncertainties. Explain why this takes time, and how conservative assumptions are built into the standard setting or permitting process to account for uncertainty until more is known. This is credible if it is explained early, when process is explained. This also involves describing how various uncertainties affect risk estimates and which ones are the most significant for your particular issue. Be sure to balance uncertainties with certainties to maintain credibility.

4. **Consider involving the public in resolving the uncertainty.** Where possible, involving the public in dealing with uncertainty is typically viewed as fairer and could lead to better solutions. Community suggestions on ways of improving risk assessment data can offer technical information (e.g., exposure routes that may have been overlooked) and can demonstrate that your agency listens and is responsive. However, caution should be exercised here as publics are sensitive to "token" gestures. Perceived tokens undermine credibility.

5. **Stress the caution that is built in to the standard-setting and risk assessment processes.** This is quite important to maintain public confidence because often people do not realize that, in the face of uncertainty, government agencies build in margins of safety to account for the uncertainty and to err on the side of health protection. Without this understanding, people are likely to be concerned about uncertainty because they fear that it leads to their being exposed to greater risk.

Public involvement in the design of air toxics control programs can help foster this understanding of building in safety margins and can help build consensus on the appropriate level for that safety margin.

6. **If people demand absolute certainty, pay attention to values and other concerns, not just the science.** Public demands for certainty and disputes over science often reveal disagreements with agency process, policies, and values. People sometimes feel that they can make more headway with an agency if they talk about science than if they talk about values, so they may focus on science when they really are concerned about agency judgment calls.

7. **Acknowledge the policy disagreements that arise from uncertainty.** In the face of such a disagreement, understand the nature of the disagreement, and have the appropriate parties acknowledge the range of opinion. For example, if the disagreement is over science, scientists should explain the differences. If the disagreement is over science, discuss science; if the disagreement is over values, discuss values.

4.5 CONSIDER RISK TOLERABILITY

In the risk assessment/risk management process, the bottom line is the tolerability of a particular risk. The public's notion of tolerable risk is closely tied to the outrage factors discussed in Section 3.4.1. In dealing with the question of tolerable risk, do not confuse understanding of risk with tolerance of it. Once your audience understands the risk, do not assume that they will be willing to accept it. Being able to separate tolerability from magnitude of a particular risk is an important step. It is useful to help people understand this distinction.[1]

Whether or not a risk is tolerable depends on a person's particular point of view. Clearly, the public, the agency, and industry may have widely different views of risk tolerability. While the ultimate decision making authority rests with the agency, people need all of the information to be available and the opportunity to have their opinions heard. However, even with the same information and level of understanding, different people will make different risk management decisions and reach different conclusions. If possible, try to involve the public in the actual determination of risk tolerability. If this is not possible, for instance when an agency has a predetermined level of tolerability, explain why a particular level is judged tolerable or intolerable.

It is often necessary to address the demand for zero risk. In such cases, try to understand any underlying meaning in the request, and convey that zero risk does not exist. The way in which one specifically responds to the demand for zero risk depends on the reason such a demand is put forth. First, the demand for zero risk may be reasonable, in that it may indeed be possible to eliminate the risk in question by perhaps a substitution of raw materials, etc. Second, the demand for zero risk may be a way of stating an opinion that the risk is too high. People take a stand for zero risk as a negotiating position. Third, a demand for zero risk may be sincere, but uninformed. You must convey that all activities carry some risk, but explain what is being done to make that risk as low as possible.[3]

Sometimes the demand for zero risk is politically motivated, perhaps in an effort to oppose a particular facility. One option here is to meet with groups who oppose the facility and discuss possible resolutions. Finally, the demand for zero risk may be a reflection of outrage or distrust. This can happen if the agency

or a particular source under consideration for a permit has appeared uncaring or not credible, or has a history of questionable credibility. Find out why the public feels this way and address the underlying issues.[3]

Finally, provide citizens with a clear understanding of risk management criteria, the process, in addition to risk assessment information. Let them know how and why the decisions presented were made. Sufficient risk management information can often diffuse much of the concern over risk assessment data, even if the public may still disagree with the decision.

4.6 PERSONALIZE RISK INFORMATION

As noted in previous sections, people are concerned about risk from the standpoint of how it effects them personally, including a personal stake in the environmental movement . A good risk communicator should come across as a caring individual, respectful and kind in their communication, and should be prepared to respond to personal questions. It is important to tell people about yourself; your background and why you are involved. Show people that you are human, and do not put on a professional air that takes the person out of you. After an oral presentation, the audience may ask the presenter personal questions as discussed in Section 3.4.2. In such a case, the presenter may decide that it is appropriate to answer based on his own opinion, or that it would be better to say that since he is representing the agency, his opinion is not what matters in this case. In any case, the presenter is representing the agency. It is best not to accept the role of defending an agency position that the presenter does not personally agree with.

Do not use distant, abstract, or unfeeling language about death, disease, and illness.[3] For example, the concept of

certain levels of exposure leading to an estimated number of "excess deaths" has been used in some risk assessments. Such a term could likely lead an audience to conclude that an agency had little concern for the lives of individuals. The concept of human lives lost or additional cases of cancer as a result of exposure would be less unfeeling.

Finally, actively listen when people are expressing their concerns and reflect your understanding back to them. Ask questions if you are unsure, "I want to make sure I understand. Did you say that ...?" Show them that their comments as well as their emotions were understood with statements such as, "I know you do not like the idea of toxic emissions emitted from this facility near your home. I understand your frustration and concern."

SECTION 4.0 REFERENCES

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5.0 GAINING TRUST AND CREDIBILITY

Trust and credibility are fundamental to successful communication. It will surprise few that trust in government agencies is low. In fact, people are more likely to believe the government when they are told something is dangerous that when they are told it is safe. There has been a decline in the public's perception of institutional trustworthiness since the 1960s. In the same period, concern for public health and safety has increased. This gap has contributed to lower public confidence in communications on risk.

Trust and credibility of an organization or institution are based on three factors: how well the system (the agency or the technology in question) works, how well the people behind that system work, and how the agency and its representatives have worked in the past. If the public mistrusts the people running the show, that mistrust will also be extended to the system, even if a technology is safe or the agency is very competent.

Public trust has many dimensions. Just as there are several audiences to address in risk communication, lack of public trust is not simply a single problem. The same kind of characteristics that would lead someone to trust a person are also important to the credibility of an institution: active listening, being present and responsive when action is needed, speaking to people at their level of understanding, and encouraging listening by sharing a stake in making a decision.

These same themes were echoed in the pamphlet "Seven Cardinal Rules of Risk Communication[3]." While several of the principles presented in these guidelines have been discussed previously in this report, they are all building blocks for trust and credibility and, therefore, bear repeating in this context.

1. **Accept and involve the public as a legitimate partner.** Two basic tenets of risk communication theory in a democracy are that (1) people and communities have a right to participate in decisions that affect their lives, their property, and the things they value, and (2) the goal of risk communication should not be to diffuse public concerns or to avoid action. Involve all parties that have an interest or stake in the issue early in the process to demonstrate the agency's respect for public concerns and opinions. Early involvement of the public can lead to a cooperative effort to solve problems. An agency can earn credibility by showing that it is responsive, that it is involving the public early in the decision-making process, that it is open to suggestions, and that the interaction between the agency and its audience is two-way.

2. **Plan carefully and evaluate performance.** Risk communication will be successful only if carefully planned. Define objectives clearly at the beginning of the process, and keep record periodically to check on your progress in reaching these goals. Evaluate the information about risks and know its strengths and weaknesses. Prepare answers to likely questions. Aim strategies at the different subgroups which exist within the general audience -- to their interests, needs, concerns, opinions, etc. Recruit spokesmen who are articulate and interactive. Carefully evaluate communication efforts and learn from mistakes.

3. **Listen to the public's specific concerns.** Take the time to find out what people are thinking. Try to put yourself in their place, recognize their emotions and their "hidden agendas," and broader economic or political considerations. Remember, people in the community are often more concerned about issues such as trust, credibility, control, competence, voluntariness, fairness, caring, and compassion rather than mortality statistics or details of a qualitative risk assessment. Knowing the

public's concerns through communication will enable the risk communicators to rely on fact rather than on assumptions about what the people want.

4. **Be honest, frank, and open.** In communicating risk, trust and credibility are the most valuable assets. They are difficult to obtain, and once lost, are almost impossible to regain. State the communicator's credentials, but do not expect to be trusted. Disclose information as soon as possible, and discuss uncertainties. Admit mistakes and get back to people with answers. Let the audience know as much as the agency does--reserving information will make the public think something is being hidden. Also, be frank about the range and limits of agency mandates. Publics are often unaware of statutory limitations, overlaps in jurisdiction, and areas outside an agency's regulatory province.

5. **Coordinate and collaborate with other credible sources.** Few things make risk communication more difficult than conflicts or public disagreements with other credible sources. Enlist credible allies and trusted or respected social groups to help communicate risk. Credible intermediaries, such as local advisory groups, physicians, university scientists, or trusted political figures, can help an agency explain risk information more effectively.

6. **Meet the needs of the media.** The media are primary transmitters of information on risks; however, they are often more interested in the politics than in the science of risk, in the simple rather than the complex, in danger rather than safety. Reporters also usually work on tight schedules, and risk communicators must give background information early, respond on time, and be open. Developing a long-term relationship of trust with reporters will afford them a credible source for information and reward agency personnel with a predictable outlet for

information. Working with the media is discussed in more detail in Section 6.0.

7. **Speak clearly and with compassion.** Simple, non-technical language should be used to communicate difficult concepts effectively, as technical jargon can act as a barrier to communication with the public. However, do not talk down to the public. If sufficiently motivated, people are quite capable of understanding complex information. Use risk comparisons to put risks in perspective. Avoid distant, abstract, insensitive language about death and illness, and acknowledge that any illness or death is a tragedy. Acknowledge and respond to the audience's emotions with compassion. Put yourself in their shoes and recognize their "outrage." Inform the public about the steps that are being taken to remedy the situation.

Additional guidelines to building and maintaining trust and credibility in risk communication are to concentrate on process, beware of mixed messages, follow up and keep your promises, and avoid closed meetings.[4]

Concentrate on process. Process includes the many steps agencies take to make decisions on issues such as the development and implementation of air toxics control programs, or permit approval or disapproval. The public tends to rely on their assessment of an agency and its process more than the details of risk assessment studies. Explaining the process to the audience and being clear about their role in the process can alleviate misconceptions about the agency. Focusing on the process of risk communication (where the information came from, what it is about, what it will be used for) will similarly aid in successful communication of risk to the public, and increase the credibility of you and your agency.

Beware of mixed messages. Technical risk issues are often difficult for the public to understand and deal with, and agencies sometimes make the situation worse by giving the public mixed messages. An example of a mixed message is to tell the community there is nothing wrong and then come in and sample with moonsuits on. Mixed messages create inconsistency and confusion, and tend to lead the public to mistrust. Multiple objectives of an agency can lead to public perception of mixed messages. If actions taken by the agency could be interpreted as mixed messages, then prior explanation of the processes involved should help to clarify the situation.

Follow up and keep your promises. A good way to instill trust and credibility in spokespersons and agencies is by keeping in touch with the audiences, even after the issue is solved. If a promise was made to make changes or to get back in touch with someone, then do it. Check to see if what was promised actually happened. Be available for further questions. Promise only what can be done, and always do what was promised. If promises were made that cannot be kept, a thorough explanation is needed, along with apologies and further recommendations. Trust and credibility involve forming a relationship over time; follow through and ongoing communication with the audience will help build that trust.

Avoid closed meetings. The agency should be sensitive to community concerns about secrecy. Closed-door meetings are more suspect than are open meetings and create suspicion of a cover-up when they are eventually discovered. Since what people imagine is usually much worse than reality, private meetings are rarely worth the cost in credibility. Meetings which are open to the public also give the public the opportunity to experience the decision-making process, upon which they base much of their agency trust.

SITUATIONS WHERE TRUST AND CREDIBILITY ARE LOW

As noted in the introduction to this section, it is not unlikely that you would begin a risk communication effort in a situation where trust and credibility are low. If that is the case, Hance et al[4] offer the following suggestions:

1. Review the outrage factors (Section 3.4.1) and the guidelines listed in this chapter, and consider which ones you may have violated.

2. Acknowledge and accept the lack of trust, but don't be dissuaded from trying to gain it back.

3. Indicate what process changes you will make to prevent trust-eroding actions from happening again.

4. Ask those who distrust you what they think would make you more trustworthy. If possible, implement their suggestions.

5. If appropriate, personalize your responses.

6. Try to reduce the need for blind trust by sharing information and involving the public early in the decision-making process.

7. Be patient. Don't expect everyone to trust you all the time, even if you feel you are trustworthy.

8. Expect to go out of your way for people and to bend over backwards to meet their concerns.

9. Acknowledge your mistakes, and try to remedy them.

Finally, understand that even when an agency is trusted and believed, people will not always agree with agency positions.

SECTION 5.0 REFERENCES

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6.0 WORKING WITH THE MEDIA

Print and broadcast media are specific audiences to be identified and targeted for risk messages, especially considering the large impact the media have on public opinion and the role the media have in informing the public and serving as the public "watchdog." To communicate effectively with this audience, be aware of their special needs and concerns as well as their special characteristics. This section addresses the characteristics and concerns of the media, selection of an appropriate spokesperson, interview strategies, and considerations of print and broadcast media coverage for a risk-related story.

6.1 GENERAL CHARACTERISTICS OF NEWS REPORTING

Media coverage of risk assessments and risk management has several characteristics the agency spokesperson needs to consider.[1,2]

Environmental risk is not a big story. Even though environmental risk may be very important to the air agency staff, reporters and editors do not see it this way. The typical news story dwells on the more newsworthy aspects of environmental risk, namely the source(s) of the problem and the fact that a problem exists. News reporters are interested in whether an environmental risk is present, not how it came to be or how it will be remedied. Once these facts have been revealed, most reporters find little significance in the remainder of the risk assessment procedures and risk management.

Politics are more newsworthy than science. Media coverage is generally more inclined to cover the political ramifications behind an environmental risk rather than the science. Politics

are more controversial and are usually seen as necessary to bring about a solution to the problem, whereas the scientific background is not considered pertinent to the present situation. One way to deal with this is to clearly describe the risk management process, as well as the scientific data.

Reporters cover viewpoints, not "truths". Objectivity in journalism is accomplished through balancing viewpoints between both sides of the controversy or problem, and reporters generally emphasize coverage of the more extreme viewpoints. When agencies are aware of conflicting viewpoints, they should present these viewpoints to the media, but provide outside collaboration for the agency point of view. Suggest to the media that they follow up on these viewpoints by contacting other sources.

Risk is often simplified to a dichotomy. As previously stated, journalists tend to divide the situation into sides to be balanced, hoping to achieve objectivity. This gives them the added "benefit" of an appearance of conflict. Journalists also tend to simplify what they cover so it is easier to understand. These two characteristics cause most of the media to dichotomize risk: either the situation is hazardous or it is safe. Methods to avoid division of your agency's facts into "yes" or "no" can include stressing to reporters what your main points are (especially if they are neutral), leaving out technical jargon, specifying the bottom line, and checking to make sure reporters notes and ideas are as you told them.

Reporters try to personalize the risk story. Reporters are often told to bring dead issues to life, to make the abstract concrete, and to focus on real people facing real decisions. One method used to accomplish this is through personalizing the situation. Reporters are likely to ask questions such as "Would you let your family live there?" In response to the statistic of one additional cancer case per year, a newspaper story might ask

"Who will teach his children to fish?" Questions like these can put you on the spot, and in answering them you may inevitably dichotomize the issue. Anticipate personal questions and give reporters personalized messages early. Section 4.6 discusses personalizing risk information.

Claims of risk are more newsworthy than claims of safety. Risk assertions generally receive more attention than risk denials. They are considered more newsworthy as reporters see safety as no real story. Your agency is charged with "safety", that is, protecting public health. Lack of safety can be used in a news story to suggest you are not doing your job. Again, relationships of trust with reporters will be helpful if such a situation arises.

Reporters work with limited time and expertise. Generally speaking, most reporters have little, if any, knowledge about air pollution control programs or toxic air pollutants. Careful explanation of terms and facts will help make the story more clear to the reporter just as it does to the public. For television, suggest pictures or film opportunities, if possible.

Also, reporters generally cover and write two to three stories per day, and deadlines may govern the accuracy and completeness of a report. In about 90 minutes, reporters have to become instant experts in order to meet their deadlines. Many times, the goal of a journalist is not to find out all there is to know about a risky situation, but to find out just enough to write the story. Recheck facts with the reporter before leaving to make sure the essentials have been noted and the facts are straight. Correct information with reporters if it is presented incorrectly, but do not expect a retraction.

Offer to provide "press kits" to the reporters, which include names, numbers, and sources of information from different

fields, glossaries (in laymen's terms) of technical and scientific terms, explanations of technical strategies and problems, and background information, all in common language and specific to your issue. These kits can educate the reporters as well as make them more familiar with the story they are covering. Information given to reporters in advance, before they are confronted with a deadline, will help them be more thorough in preparing stories. Experienced reporters may request this information.

6.2 SELECTION OF A SPOKESPERSON

Delivering a risk message through the media requires selection of an appropriate spokesperson. The audience wants to hear from people knowledgable in the specific risk topic and people who have power to make necessary changes. Managers of State and local air agencies are good choices. Having other experts on call, including health, safety, environmental, public relation, and political sources, is certainly recommended, as is working closely with the agency public information officer. However, the main task of dealing with the media lies with the agency spokesperson.

Spokespeople need good general communication skills to be effective. They must be able to speak well in public, to be confident about the information they are presenting, to avoid technical or scientific jargon, and to clarify misunderstood concepts. Interacting with the public by listening, giving feedback, and responding to their concerns are also essential. Developing and mastering these skills is vital.

It is much easier for a spokesman to meet these challenges if he or she personally agrees with the agency position. If a chosen spokesman does not personally agree with the agency position which must be explained and defended, it is usually best

if another spokesman is chosen.

6.3 INTERVIEWS

A personal interview with media personnel is one method State and local agencies have for informing the public about specific risks. Careful preparation for the interview is the best insurance for successfully informing the media about risks and risk assessments associated with air toxics. Recommendations for preparing for an interview include the following:[3]

* learn who the audience is and what issues they are concerned about
* find out how much the audience knows about the issue
* decide what information is necessary to convey, how much time there is to explain the agency's position; find out how much remarks will be edited, then pre-edit your own responses.
* find out who will be conducting the interview. If appropriate, research that reporter's background to get a feel for the style, nature of questions, etc. to expect.
* ask who else will be interviewed and what topics they expect to cover
* learn what others are saying about the issue in preparation to defend your agency's position
* consider the reporter's deadlines, and accept his or her need for promptness in the interview
* know your answers thoroughly. Research the issue, and be prepared to answer succinctly questions specific to every aspect of the issue. Practice your answers using a tape recorder.

* know what economic impacts might result from the agency's actions

* prepare yourself to represent the agency's views, regardless of your own position

During the interview, you can communicate accurately and successfully by following several guidelines[3]:

* emphatically place your strongest points early;
* be concise, and stick to your key points;
* explain the subject and context of each major point;
* personalize your message with anecdotes and illustrations;
* avoid technical or scientific jargon;
* offer to find out information you do not have;
* tell the truth; when you do not know the answer to a question, say so;
* simplify statistics to get the message across;
* remember that everything you say is "on the record".

After the interview, contact the reporter and follow up on topics, if necessary. Offer to answer reporter's questions about issues you discussed. Read the reporter's story, and immediately contact the reporter if facts are inaccurate.

6.4 CONSIDERATIONS FOR PRINT MEDIA

Knowledge of the different job titles and forms of printed media will enable the agency spokesperson to decipher some of the jargon found in dealing with the media and to understand the expectations and needs of those individuals.[1,3]

People in print media

City editors or news editors supervise hard, fast-breaking, local news stories and local day-to-day news gathering. The reporters covering your story may or may not be informed about your subject, depending on the amount of research they have done prior to your interview.

Feature editors supervise longer, soft, human-interest stories.

Medical, science, or health editors supervise a wide variety of scientific stories, including the types described for city news and feature editors. These reporters are more likely to be educated in technical areas; however, they may or may not be the ones dealing with the agency spokesman, depending on their availability, schedule, etc.

Special section editors supervise such sections as the Sunday review, local interest stories, and special assignments.

Editorial page editors cover editorial opinion topics and positions.

General assignment reporters cover stories as assigned. They may be covering risk stories, and like city or news reporters, may have limited knowledge about the topic they are covering.

Forms of print media

Metropolitan daily newspapers usually have a complete staff of reporters and editors, along with a science editor who would probably cover your specific story. Deadlines range from 30 minutes to 30 days.

Weekly or special interest newspapers will have a small

staff, and coverage will probably be performed by a news editor. Deadlines run around seven days.

Magazines usually work three to four months ahead of publication, and you may by contacted by either an author of an article or by the editor of the magazine.

Wire services cover and feed stories to press outlets across the country. These stories may originate from local reporters. Deadlines are usually tight, and the story will be edited as seen fit by each news outlet.

6.5 CONSIDERATIONS FOR BROADCAST MEDIA

Broadcast media, like printed media, have various jobs and programs used to deliver the news, an understanding of which can be useful to agency risk communicators.

<u>People in broadcast media</u>

News editors review all news and decide on what topics to broadcast.

Assignment editors schedule and dispatch news crews to cover important situations.

Health, medical, or science reporters cover scientific stories for broadcast. These individuals will most likely be covering your story.

Newscasters prepare and deliver the news on the air. They frequently research background information as well.

Program producers control content, conduct research, and schedule guests for particular programs.

Public service directors review and approve requests for public service announcements and schedule them for broadcast.

General assignment reporters cover a variety of stories, and usually have limited knowledge about the topic they are covering. These individuals may be conducting your interview.

Programs in broadcast media

News interviews are conducted on tight deadlines, and are often spur-of-the-moment decisions. Interviews may be edited to several 20 or 30 second responses, so make responses accurate and succinct. Interviews with other individuals may by included to get "both sides of the story".

Feature/magazine shows highlight issues more closely, usually in about a 10-minute segment. These also are edited, can be shot on location, and can include differing opinions.

Talk shows can allow for full discussion of a topic. These may be edited, and may have other guests, call-in questions, or a studio audience.

Some special tips for dealing with the media through both radio and television coverage include:

* speak distinctly, and vary your pitch;
* do not read a script; be familiar with the planned material; practice
* use active verbs and personal pronouns;
* use your interviewer's name;
* try to paint a picture with your words;
* look at your host while talking to them; look at the camera lens when answering a question;
* SMILE (if not inappropriate);
* be alert to your body language;
* be open to questions, and add explanation where needed;

* for television coverage, do not wear white shirts; facial powder and make-up may be helpful; dress appropriately (how you dress says a lot about you);
* maintain good posture during the interview;
* stay alert, and be ready to answer questions promptly.

In conclusion, spokespeople should recognize and prepare for the idiosyncracies of news reporting. Following the tips and suggestions offered here can improve how the spokesman and the agency are perceived and understood by the public, and can help agencies to use the media as a vehicle to relay risk messages.

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RISK COMMUNICATION

TRAINING INSTRUMENT

U.S. Environmental Protection Agency - Region 9

PUBLIC MEETING

TYPICAL QUESTIONS & SAMPLE RESPONSES

Prepared by

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Following is a list of questions which are often asked by the public, along with some typical responses. The list is taken from EPA, Region 9's Risk & Decision Making and Risk Communication & Public Involvement Courses. It serves to illustrate the use of EPA's Seven Cardinal Rules of Risk Communication and the careful preparation that is required.

The authors welcome your comments and any suggestions for additional questions. Based on your responses, the list may be expanded or revised. All comments may be directed to the authors at (415) 744-1019 or 744-1018.

A CAUTION TO THE READER - The sample responses are offered *only* as *ideas,* from which you must develop your own responses. The responses are *not* intended to be memorized and used verbatim. A response may be used only if it addresses the specific needs of your audience, and it is comfortable for both you and your agency. *Your responses must be open, honest, frank, and meet the needs of your public or audience.* It may not be obvious, but developing your responses usually requires policy input from management as well as technical input from other credible sources. *This preparation is essential to your performance; if you fail to prepare, you can't expect to gain the important trust and respect of our public constituents, and you won't be effective. (CR 2)**

* Cardinal Rule #2 from EPA's Seven Cardinal Rules of Risk Communication (See page 2.)

EPA's

Seven Cardinal Rules of Risk Communication

1. **Accept and involve the public as a legitimate partner.** (CR1)

2. **Plan carefully and evaluate your performance.** (CR2)

3. **Listen to the public's feelings.** (CR3)

   (Examples of *"active listening"* are offered in some of the answers to the questions which follow. These specific examples are underlined for easy reading.)

4. **Be honest, open, and frank.** (CR4)

5. **Coordinate and collaborate with other credible sources.** (CR5)

6. **Meet the needs of the media.** (CR6)

7. **Speak clearly and with compassion.** (CR7)

1. Q. **Why can't I ask my question now?**

Underlying Public Need: The Agency agenda isn't working and the public would like their concerns and questions addressed first.

A. Sounds like there are a lot of questions that need to be answered now. Maybe we should do that first and save the rest of the agenda for later? Is that OK? (Principles: Listen, feedback, and accept the public as a legitimate partner in deciding on the agenda.) (CR 1, 3)

A. I know you all have a lot of questions that you want answered. Would it be alright if we proceed with the 20-30 minute presentation, where I suspect that many of your questions will be answered, and then leave the next period of time for the rest of your questions? (Principles: Listen, feedback with a recommendation and accept the public as a legitimate partner in deciding on the agenda.) (CR 1, 3)

A. Poor Response: Please let me finish my talk! (Not listening to the audience's need for answers to their questions, and giving the impression that we don't care and that we know better than they do. Thus, we are not treating them as legitimate partners.)

A. Poor Response: **Please** (*with hand raised at audience*) all questions will be taken after our presentation! We need to follow the agenda. Let us give our presentation and then we'll take questions.

2. Q. **Why won't you answer my question? (This is usually a follow-up question to Question #1 when the Agency insists that questions will be answered only after the presentation.)**

Underlying Public Need: The public would like to vent feelings and have us listen and be responsive so that they can find out if we are on their side and taking adequate action. Also, they may not want a "slick" presentation but are more interested in direct answers to their personal questions.

A. I apologize if we have not answered your questions. I have written your questions here (on flip chart), and I have saved this part of the agenda to answer them. I think that many of your questions will be answered in the 20-30 minute presentation that we have prepared, and it may save everyone some time. Our presentation will cover some important questions which may be on your mind such as, "Is my family safe? What are we

planning on doing about it? What's been going on?" If that sounds like it will work for you, could we proceed? And if it isn't working, then we'll have to think of something else. (Principles: Listen, feedback with helpful suggestions and involve the public in deciding how to proceed.) (CR 1, 3)

A. You've asked a very good question and maybe we haven't been listening too well. How many of you have questions and would like them answered? I see there are a lot of questions. Let me make 2 suggestions for how you might want to proceed, and you can tell me if either one sounds good. (Principles: Listen, feedback with helpful suggestions and involve the public in deciding how to proceed.) (CR 1, 3)

One suggestion is to answer your questions first until they are all answered, and then if you are still interested and have the time, we could give our 20 minute presentation. Also, we have a fact sheet which summarizes much of the presentation if you can't stay for the whole meeting.

The other suggestion is to let us give a 20-minute presentation so that everyone will have some common understanding of the situation, and be able to ask some questions which they may not have otherwise. We have a 20 minute presentation, and it may answer many of your questions. After the presentation, we can spend the rest of the evening answering all your questions. Since there are a lot of questions, and many of you can't stay pass 11 P.M., when the meeting was suppose to end, we will try to accommodate your questions first and stay until all your questions have been addressed.

Now let's have a show of hands to decide how we should proceed. How many would like to hear the presentation first? How many would like to get at the questions first?

A. Poor Response: Sir, if you would just let me finish, I'll get to your question at the end, and we'll answer all questions then. (Not listening to the public; Agency is more concerned about sticking to the agenda and maintaining control of the meeting. In its attempt to maintain control, the Agency will likely lose control. An important point to consider: If your meeting goal is to give your presentation at any expense, then this would have been a good response. However, this is usually not our intended goal. Our goal normally is to try to meet the needs of the community in trying to solve the environmental problem. Given that as our goal, if a community is insisting to be heard

we should recognize their need and try to meet it, or present them with alternatives that meet both their needs and the Agency's, and let them choose.)

3. Q. What have you done about it? Why are you taking so long?

Underlying Public Need: The public would like to know if we are being responsive in correcting the problem, and if we care.

A. Sir, you'd like to know what we're doing, and you're angry that it's taken so long. We share your concerned about taking care of this as quickly as possible. Unfortunately, there are no simple solutions for cleaning up hazardous waste sites. Each site must be carefully characterized before a clean up plan can be made to enable us to do a good job. This takes longer than we would all like but it is needed to ensure that it is done right in order to safeguard public health. We are proceeding as fast as we can, and here's what we are doing: ..... (Principles: Listen, feedback, share concern, and answer.) (CR 3, 4, 7)

A. Poor Response: Ah, Ah, Ah.....Don't you know we're doing our best! (Didn't have an answer, wasn't prepared to answer a basic question, and became defensive. This increases the public outrage which delays discussion on options and solutions.)

A. Poor Response: I have 5 other sites that I'm working on and I'm working hard on all of them. (The public is not interested in other sites or excuses. They want to know what we *are* doing about *their* site to protect them.)

4. Q. Why haven't you closed the plant? How many more cancers do you want?

Underlying Public Need: The public is worried about cancer (or some other health issue) and needs to know how we're planning on addressing the problem and if we care about them. To the public, closing the plant is a logical solution.

A. We haven't closed the plant because it isn't posing an immediate hazard. There will be a public health hazard if we do nothing. The long term exposure could present a health hazard. Here's what we are proposing, and we believe it will correct the problem, protect your health, and not create a hardship for the people who are currently employed at the plant. (Principles: Give a direct answer that addresses our concern for protecting people's health and welfare, and state our actions.) (CR 3, 4, 7)

A. Poor Response: Let me finish my presentation!

A. Poor Response: We've been working with the plant, and we don't think that it's necessary!

5. Q. Is it safe? Are my kids safe?

Underlying Public Need: The public needs to know if there is any immediate danger to their family and that we care about that. They want "micro" risk answers to the "Am I safe?" questions, not "macro" risk answers which the Agency has been concerned with in their decision making, i.e., "The hazard presents a 10^{-5} risk to the community."

A. Any cancer causing agent is potentially dangerous (The non-threshold concept). DNC is such a substance. Based on our knowledge of the amount of DNC that people are being exposed to, we feel it is safe for all residents east of Electrobotics because it isn't in the air or drinking water. For residents to the west of Electrobotics, DNC is only present in the air, but in such small quantities that exposure will only be a health concern if it is not reduced in the next several years. We are proposing to reduce and minimize the exposures to DNC by permanently capping the source of the DNC to eliminate its presence in the air, and cleaning up the contaminated soil to minimize the contamination of the water. This will make it safe. (CR 3, 4)

For a more typical case when the contamination ***cannot*** be totally removed from the ground water, a response could be:

A. Any cancer-causing agent is potentially dangerous (The non-threshold concept). DNC is such a substance. Based on our knowledge of the amount of DNC which people are being exposed to, we feel it is safe for all residents east of Electrobotics because it isn't in the air or drinking water. For residents to the west of Electrobotics, DNC is only present in the air, but in such small quantities that exposure will only be a health concern if it is not reduced in the next several years. We are proposing to reduce and minimize the exposures to DNC by permanently capping the source of the DNC to eliminate its presence in the air, and cleaning up the contaminated soil to a safe level. (In this case there will be a finite but small concentration of DNC remaining in the drinking water, but it will be at a level which is between 10^{-4} to 10^{-6} risk which we, as Agency personnel, have established in the regulatory processes for various air, and water standards as being "safe." This still may not be acceptable to

some people, and understandably so, especially if they hadn't been involved in the decision making process. Similarly, it may not be acceptable to you because the risk is not zero, and a residual risk remains.) (CR 3, 4)

A. We believe it is safe for you and your kids to drink the water and breath the air. There is no DNC in the drinking water, but we feel there will be in the future if a leak from the company's holding pond is not controlled. There is some DNC contamination in the air and this will become a dangerous situation if it is not controlled and people are exposed to it over their entire life. (CR 3, 4)

A. Poor Response: The life time risk of getting cancer based on the current level of DNC in the air is 10^{-4}. Based on that estimate, we feel that we should reduce the risk to a level of 10^{-6}. (What's probably not needed here is more jargon.)

6. **Q. Are there any safe levels for a carcinogen? (Class A, B, or C carcinogens)**

A. EPA has identified some chemicals as (A) known, (B) probable or (C) possible human carcinogens based primarily on human data (A), and on animal studies (B and C). If we believe it to be a carcinogen, we assume that all levels of exposure will have some level of cancer risk. The smaller the exposure, the smaller the risk. We generally describe these risks in terms of probability. If in asking your question, you want to know if there are levels of exposure that are free from risk, the answer is no. If, on the other hand, you are asking whether certain levels of chemical exposure are too small to be of a health concern, then the answer is yes. Our goal is to reduce the level of exposure to a safe level where it will be safe to drink the water and breath the air. (Remember that a safe level does not necessarily mean zero risk. It could mean for example that 10^{-4} or 10^{-5} risk is a safe level. There are many reasons why zero risk may not be feasible, but one must also remember that 10^{-4} or 10^{-5} are upperbound or maximum risks. This means that the actual probability may be much lower and might even be zero because of all the health protective assumptions that are used.) (CR 3, 4)

7. Q. **Would you drink our water? What about breathing our air?**

Underlying Public Need: Again, the public would like to know how this affects their family and if we are sincere about our concern for them.

A. Yes, I would drink the water because it is not contaminated, and I am here breathing the air because it is such a low risk that it isn't a health problem. I understand that some may feel that any concentration of DNC in the air is unsafe. If you feel that way, I would recommend that you consult with your doctor or do what you feel will make you more comfortable. However, we feel there is no immediate hazard, and we can clean up the situation so that there will be no long term health concern. (If there was an immediate health hazard, an emergency response action would be ordered, or bottled water could be offered or recommended if the drinking water was contaminated.) (CR 3, 4, 7)

A. Poor Response: That's a personal choice whether to drink the water or not.

A. Poor Response: (Hesitates and doesn't answer.)

8. Q. **How can you say it's acceptable? My family has cancer! Look at the neighborhood and all the sickness and cancers!**

Underlying Public Need: Public wants to have some control over determining what is acceptable, and to have it be as safe as possible.

(The phrase "acceptable risk" should not be used because it requires a value judgement which can only be made by the public, not solely by an agency. An agency can decide what it considers "safe" and the public has every right to say that it isn't acceptable.)

A. I'm hearing that you're not satisfied with our clean-up proposal, and that you're very concerned about the cancer which the contamination may cause. We too are concerned, and that is why the clean-up plan that we are proposing addresses the concern for safety. The plan will clean up the contamination to a safe level. However, it sounds like you might be more comfortable with a greater-than-safe level which we are proposing. I can't make any promises, but I would be interested in any ideas or concerns which you may have. But at this time, I am confident that our proposal will make it safe for you and

provide the level of health protection which you are expecting. (CR 1, 3, 4, 7)

A. It's unfortunate that there is so much sickness. I am concerned and sad to hear that. Our goal is to make it as safe as possible with your input. I believe we can develop a solution to control the risk. (CR 3, 4, 7)

A. Poor Response: It's acceptable because the risk is 10^{-6}. Based on that risk level, we don't see how those illnesses and cancers can be attributed to DNC.

A. Poor Response: We don't know what caused the cancers. However, you should know that 1 out of 4 of you will get cancer in your lifetime because of everyday activities and exposures. For example, it's more likely that you'll get cancer from eating peanut butter or charcoal broiled steaks than it would be from exposure to DNC. (Whether this is true or not is irrelevant when people are upset. The people want to be involved. They are not asking for an explanation. In this case, an explanation belittles the public and their concerns over the site.)

9. Q. What does 1×10^{-6} mean? What is risk?

Underlying Public Need: The public needs to know if we're trying to "snow them" with jargon or if we're looking after their best interest. Discussing first how the situation affects them personally, i.e., "Is it safe?" will reach people directly and get at their needs. Then, the public may want to have specific technical discussions about risk calculations. Often, if the agency has done a good job addressing the "Is it safe?" question with honesty and compassion, the agency will have established some level of trust and credibility where the public will be willing to focus on the 10^{-6} terminology. Surprisingly, if the agency has done its job well in establishing trust and credibility with the public, the public's need to know about 10^{-6} will not be needed! Often times agencies tend to focus on the 10^{-6} issues too soon with the public without adequately addressing the real public concerns. This then creates a diversion to argue about 10^{-6} and misleads the agency to think that if only they could have explained 10^{-6} better, it would have not created an argument with the public. The argument was probably over the agency not listening, and as a result some underlying public needs were probably not met.

Assuming that this question is asked in a technical meeting, some answers could be:

A. Risk is the probability or chance of getting cancer. 1×10^{-6} is another way of saying one-in-a-million chance of getting cancer (above the normal background cancers). In our definition, one-in-a-million is a probability based on data and many health protective assumptions that there may be one extra cancer case in a population of 1 million people over a lifetime of exposure to a chemical. The probability is an upperbound estimate and can be thought of as a maximum probability because worst case situations are assumed where science has no definite answers in order to be on the safe side of protecting public health. For example, "How is cancer caused?" is still an unanswered scientific question. To make up for this uncertainty, and since it is difficult to study human subjects over their lifetime, we rely on animal studies to determine the carcinogenicity of most chemicals. Because the one-in-a-million probability is an upperbound or maximum probability it means that a cancer case may not occur at all, but if it does, there is at most a one-in-a-million likelihood for an extra cancer case above the expected 250,000 cancer cases that would normally occur in a population of 1 million. (Remember, in the absence of sufficient data, worst case and upperbound assumptions are used in the risk assessment. This means that calculated risks are probably orders of magnitude higher than they should be, but since we don't have definite data and we are dealing with carcinogens, we want to be protective of public health and safety.) (CR 3, 4)

A. In this situation, we are talking about cancer risk. Cancer risk is the likelihood or chance of getting cancer. When we write, "1×10^{-6}" or say "one times ten to the minus sixth," we are using scientific terms to say "one-in-a-million." If we were to say there is a one-in-a-million excess cancer risk from a given level of exposure to a chemical, we mean that each individual exposed to that chemical at that level over his/her lifetime has a one-in-a-million chance of getting cancer from that particular exposure. This is similar to saying that because of that chemical we could expect to see one additional cancer case in a population of one million people who are all exposed under the same circumstances. However, we say "excess cancer risk" and "additional cancer" because we already expect to see, due to all other causes, about 250,000 cancer cases in a population of one million people.

You should also realize, however, that there is a great deal of uncertainty that accompanies our risk estimates. Science has not yet progressed far enough to explain exactly how cancer is caused. Nor can we ever be absolutely sure of the levels of a

chemical that are present in the environment. But in order to be protective of public health, our risk assessments are designed to account for the various uncertainties. In fact, where our information is incomplete, we use assumptions that tend to overestimate the risk in order to further insure that we are being health protective. As a result, when we estimate that there is a one-in-a-million risk, the actual risk has very little chance of exceeding one-in-a-million. In actuality, one-in-a-million most likely overestimates the actual risk, and, in fact, may be zero.

Assuming that this question was asked at a non-technical public meeting, some answers could be:

A. 1×10^{-6} is an expression which scientists often use to express one chance in a million. This in risk terms means one chance in a million of getting cancer from being constantly exposed to a certain level of a chemical over one's lifetime of 70 years. If that still isn't a good enough explanation, let me explain it another way and hopefully, this will be more helpful: DNC is a dangerous chemical because we have reasons to believe that it may cause cancer. Currently, there is no danger to you if you drink the water because it isn't contaminated. The air is contaminated with DNC, but in such small levels that it is safe in the short-term provided we further reduce the contamination to a lower level where it will be also safe in the long-term. I'm sorry if this sounded confusing because on the one hand we're saying it's safe in the short term, but on the other hand we're proposing to clean it up which will make it safe in the long term. If this is still confusing, let me use an analogy which may make this a little clearer. Some of you may say that my example is ridiculous because it will never happen, and you're right, but for a lack of a better example, allow me to try this one just to see if it gives you at least a better feel for what we have been talking about:

Imagine that there's a pallet of cement weighing 900 lbs suspended over your house. The pallet is being held by a cable which is rated at 1000 lbs. You are safe because the cable hasn't snapped and it isn't likely to. You may feel safe for a long time if the pallet remains overhead because the cable can probably support 2000 lbs. There is usually a safety factor built into the strength rating; however, you and your family may feel very nervous because you don't normally have a pallet of cement hanging over your home and there may be some risk that the cable will break. Because you're concerned about your family's well being, you'd probably like to get rid of it completely but let's

assume that it would be too difficult or unaffordable. Then you'll probably try to do something like reinforce the cable or reduce the load so that you increase your confidence that your family won't get hurt. This is an unlikely example, but as an illustration, it may be useful. It is similar to our situation with DNC in the air. In that situation, the the weight of the cement or DNC contamination is closer to 500 lbs and our clean up plan calls for the cement or DNC to be reduced to less than 5 lb. Even with 500 lbs of cement there is still some small chance that the cable might break, and reducing the weight to less than 5 lb would greatly reduce that chance. In other words, for our situation around the Electrobotics Plant, we think it is presently safe, but we would feel much more confident about everyone's safety over the long term, if we could make it safer by further reducing the contamination of DNC. That is what we are trying to do. Even though this example doesn't give you a precise answer to what 10^{-6} is, I hope it gives you a better idea of how small 10^{-6} risk is, and why we are proposing these actions. (CR 3, 4, 7)

As in any response, this one may not be satisfying to everyone, and you may need to be prepared to offer other examples to be more helpful. For example:

A. <u>It looks like that analogy wasn't too good for everyone</u>. Maybe some of you now have some more specific questions that could help me to explain this better, or maybe I could meet with those of you who would like to discuss it further after this meeting. If you want, I could give you another example?

Other examples: A 10^{-6} risk level is equal to the risk level associated with EPA's drinking water standard for TCE, a probable human carcinogen; or 100 times more stringent than EPA's drinking water standard for vinyl chloride, another cancer causing chemical; or 10 times more stringent that EPA's air standard for benzene, also a carcinogen.

A. Poor Response: It's almost like getting four-of-a-kind in a poker game. (If people are expressing doubt or confusion about the terms, and you proceed to explain the terms with more unfamiliar or technical terms instead of looking for a more relatable explanation or example, it will be non-productive and create outrage.)

10. Q. Am I the one-in-a-million? Why isn't it zero?

Underlying Public Need: The public is concerned about how they will be affected personally, but now is also indicating they might be interested in being a part of the risk management process to decide on "acceptable" risk.

A. We sincerely doubt if you will get cancer from DNC because we've used several worst case exposure scenarios to be on the safe side in arriving at this figure. For example, we've assumed a maximum exposure to DNC of 24 hours/day, 365 days/year for the next 70 years. If this describes your current situation, you may have at most a one-in-a-million chance of getting cancer from DNC. Conversely, under those extreme exposures you have at least a 999,999 in-a-million chance of not getting cancer from DNC. In your case, I would guess that you will not constantly be exposed to DNC for all of your life, and thus your chance of getting cancer from DNC is much less than one-in-a-million, and for all practical purposes is zero. After the clean-up, we will be able to say that your chances of getting cancer from DNC is as likely as getting cancer from drinking bottled water all of your life. (CR 3, 4, 7)

A. Poor Response: Chances are you will not be the one-in-a-million to get cancer from being exposed to DNC. You're more likely to get cancer from eating peanut butter and charcoal broiled steaks which also contain carcinogens.

11. Q. What does 1 ppb mean; 1ug/l; 1ug/m^3?

(The context of this question is that we've been using 1 ppm in all our previous discussions and now we've introduced 1 ppb. This is a technical question requiring a technical answer which should be given in terms that are familiar to the audience. The second response provided below can also be used to clarify "ppb" when it is introduced in a public discussion.)

For example,

A. <u>I'm sorry if we've confused things by switching from .1 ppm to 1 ppb concentration</u>. Here's one way to explain it:

1 ppm is 1000 ppb, or
1 ppb is a 1000 times smaller than 1 ppm

Another way to visualize 1 ppm is that is it is 1/1,000,000, and this would make 1 ppb 1/1,000,000,000. (Write the numbers on a flip chart to help illustrate your points.)

Even though these may be small numbers or small concentrations, a small concentration of a certain toxic chemical may still hurt you. Whether it can hurt you depends on the chemical, how much and how long you're exposed to it.

A. 1 ppb is a term for expressing concentration. 1 ppb is similar to one drop of water in an Olympic size swimming pool, 1 second in 32 years, or 1 item out of a billion of those items. I hope these examples are of some help. (CR 4, 7)

Does that clear up the confusion? (CR 3, 4, 7)

A. Poor Response: (Answering with technical terms or jargon similar to the previous response when the question was actually a non-technical question is a poor response because it doesn't address the real needs of the audience.)

12. Q. What does RCRA mean?

A. See Answers to Question #11. (Avoid jargon and explain terms early in your presentation. Referring to "RCRA" as the "law" or the "regulations" may also be sufficient and won't sound so jargony once people are familiar with your term.) (CR 7)

13. Q. How can you trust the company?

Underlying Public Need: The public needs to know that our primary concern is for their health and well being.

A. We don't take the company's data on face value. We critically review the data and the process by which it was derived to ensure its credibility. If we had any doubts, we would get additional, more reliable data. Our goal is to protect your health by ensuring that we have the most reliable data from which to base our decisions. Unfortunately, because we have a limited budget and there are more problems than we can address, we must rely on company data and do our best to ensure its quality. (CR 3, 4)

A. Poor Response: Why do you think we trust the company? (Defensive, and does not answer the question.)

14. Q. Why did the company have to tell you? Why didn't you spot the problem and why did it take so long?

Underlying Public Need: The public probably needs to vent their frustration about the situation, and to feel that we have been and are currently doing everything that we can. They may need an honest apology from the agency for any delays, and to know more periodically that progress is being made.

A. You would have wanted us to have known about the problem earlier. We wish we could have also. Unfortunately, we operate under limitations. (As some examples: We didn't have any authority in this matter until recently when the regulations came into affect; Nobody knew DNC was a carcinogen until recently when the cancer data was published; and, We have limited resources to deal with these problems.) However, we are taking actions to solve the problem, and here's what we are doing to protect your health: .....(CR 3, 4, 7)

A. Poor Response: We're doing the best we can, and I would appreciate it if you could be patient and try to understand that we are doing our best.

15. Q. What does 0.07 deaths mean? How can you have a partial death?

Underlying Public Need: The public is confused by the information and would like clarification so that they can better understand it.

(A suggestion here is to revise the presentation and increase the population size even if it is larger than the real population to make 0.07 be a whole number. For example, 7 out of 100 million would be less confusing.)

A. I apologize for our poor example. Another way that may help to explain what we mean is to say that out of a population of 100 million people who might be exposed to this chemical, we might expect that no more that 7 cancer would result in a lifetime. So for a population of 100,000, it would be unlikely that there would be any cancers attributed to exposures to this chemical. Does that explain it better? (CR 3, 4, 7)

A. Poor Response: I'm not sure. (Even though this may be an honest response, it is embarrassing that such a basic question could not have been answered; this hurts credibility. The public

would have expected an agency representative to have answered this question.)

A. Poor Response: Of the 100,000 people that would be exposed, a maximum of 0.07 deaths might result.

16. Q. What do you mean you don't know?

Underlying Public Need: The public probably needs to vent their frustration and concerns, and may also need a genuine apology from agency officials. IMPORTANT RULE: If you don't know, you should be open, honest, and frank and say so. You may have to repeat this several times, but never guess or make up an answer because you feel pressured; this is a sure way of losing any trust and credibility you may have established.

A. I'm sorry I don't have the answer today. Would it be O.K. if I called you next week after I've done some checking to see if I can get the answer for you. May I get your phone number after this meeting? (CR 3, 4, 7)

A. You sound very disappointed, but I'm sorry, science just doesn't have all of the answers for us. (CR 3, 4, 7)

A. Poor Response: We don't know, and you can't expect me to know everything. (A rational response in this case fuels more anger when all people probably needed was to vent; any sarcasm added to the rational response just makes it even worse.)

17. Q. If we can't get action from EPA on maintaining the value of our property, who can we go to?

Underlying Public Concern: The public is no longer just outraged, but it is now ready to consider solving the problem. They also realize that EPA can't do all they had initially expected.

A. I share your concerns about the value of your property. We are trying to protect your health and in doing so, we may have to consider some remedies that may not make you happy but will protect your health. Our goal is to find a remedy that will protect your health and not affect your property values; but our primary concern is with your health. Your ideas and input will help us make the best decision. I encourage you to comment on the options that we will be considering, and I hope that in doing so we can correct this problem to your satisfaction. (CR 3, 4, 7)

A. Even though we can't do anything directly about your property values, here are some suggestions: .....which may be helpful. Are there other ideas that someone else would care to offer? (CR 1, 3, 4, 7)

A. Poor Response: We *have been* working hard to solve the hazardous waste problems. Right now I'm working on 5 other NPL sites and your site is getting most of my attention. We don't have legal authority to address your property value concerns. (We're not listening to people's needs and reacting naturally, and inappropriately being defensive; this tends to create a negative perception that we're unwilling to consider or consult with other credible sources when it is needed.)

18. Q. I've been working here for 15 years and I'm fine. How can you say there's a problem?

Underlying Public Need: The public needs to know how credible we and our science are. This may represent some denial of the individual risk at hand.

A. Sir, I'm very happy that you are fine, and I hope you remain that way. Unfortunately, I can't make that assumption about everyone else because some of your fellow residents may not be as healthy as you, and I must be cautious to ensure that everyone's health is being protected.

In saying that DNC is a probable carcinogen and that it has contaminated the air, we are not trying to create more of a problem. Unfortunately, science doesn't have all the answers that you and I would like, but we have to deal with that. In dealing with this, we use many health protective assumptions to make up for the uncertainties that remain in science. In our deliberation and examination of the health effects information related to DNC, we believe that it is a carcinogen which should be treated seriously. We do this to ensure that you and your family do not suffer from any future health problems. Because of the uncertainty in science about the causes of cancer, your statement of good health doesn't surprise me. Unfortunately, I cannot say with your degree of confidence that DNC is safe; the health data says we should treat DNC contamination with caution. Our goal is to ensure that you, your family and everyone in your community can say with your degree of confidence that the DNC exposure is so small that it doesn't pose a danger. (CR 3, 4, 7)

A. Poor Response: Your case is an exception. Our animal studies combined with our use of health protective assumptions in the risk assessment indicate that there is a cancer risk which may not be seen for another 20-30 years. (Even though you understand risk assessment, being argumentative and not acknowledging people's views can create obstacles in future communications. In this case, it creates unnecessary or false concerns.)

19. Q. **One of our very close friends who lived near the hazardous waste site just died from cancer. *(Person breaks down in tears.)* How long are you bureaucrats going to take before we see some action? How many more people must die? We're taxpayers and *we* pay *your* salaries! I'm totally frustrated and angered by the amount of pressure we need to put on your office who we pay before we can get any action. What do you have to say for yourself? I want to hear! *(Person breaks out into tears.)***

Underlying Individual Need: The individual is very upset about the loss of a dear friend, and is probably needing, most of all, some place to vent their legitimate emotions, and perhaps to get some compassionate response.

A. Silence. (No response is needed or expected. One can satisfy the person's need for compassion by genuinely listening with empathy until the person stops. While listening, you may hear and decide that people may want to know more frequently what is being done, and what the schedule for future action is. Providing that information later may give people a better idea that things are being done and when they can expect them to be completed. Often times, not regularly presenting that information, will give people a false impression that nothing or very little is being done.) (Principle: Listen with compassion.) (CR 3)

One listens and allows the individual to vent emotions, and empathically responds:

A. <u>I'm sorry for your loss</u>. If you would like, we could discuss this some more after the meeting. (Principle: Listen and respond with compassion.) (CR 3, 4, 7)

One listens and allows the individual to vent emotions, and empathically responds:

A. <u>This is an especially sad and difficult time for you</u>. I'm so sorry for your loss. (CR 3, 4, 7)

A. One just keeps quiet. (Because you were surprised by the emotional outburst, and may not know what to say, being quiet is the next best thing to do, given that no response was expected. Being quiet may also be hard to do because one may feel that a response was expected. Most of the time, all a grieving person wants is just a chance to vent their emotions and to share their grief.) (CR 3, 4, 7)

A. Poor Response: (Interrupts the individual and gets somewhat defensive.)

We're doing the best we can. Why, last week we finished the proposed permit, report or RI/FS, and by next month we should be making a decision. Please be patient with us.

A. Poor Response: I'm sorry your friend died, but all of you should know that 1 out 4 of you will get cancer in your lifetime anyway from normal daily activities. Specifically, for the hazardous waste site, the added lifetime risk of getting cancer is only 1 in 10,000. Since there are 5,900 people in this community, we would not statistically expect to see any excess cancers in such a small population.

A. Poor Response: I'm sorry your friend died, but it probably wasn't because of the hazardous waste site because it's only been there for 5 years and it normally takes 15 years or longer for someone to develop cancer. We are doing everything we can.

A. Poor Response: Your friend's death is unfortunate, but you shouldn't be blaming us or the hazardous waste site because we had nothing to do with it.

20. Q. **You don't have to live in our neighborhood! You don't have to deal with the stigma associated with this hazardous waste site! I've got my life savings tied up in my home! Would *you* live here? Would *you* buy my home?**

Underlying Individual Need: This person is very concerned about their property losing some of its value, and would like to know if the Agency is doing everything possible to ensure that property values will be protected, i.e., Are you, as the Agency representative, doing as much for the neighborhood as you would if you were a resident?

A. <u>Sir, it sounds like you'd like to know if I would buy a home here, but I think your real question or concern is about the type of clean up we will be doing to ensure that your property values</u>

are not affected, and that are we doing everything we possibly can. Would answering that question be more helpful? (CR 1,3,4,7)

Option 1. If so, here's what we are doing: ..... I would like to stress that our goal is to ensure that your environment is safe to live in. In other words, to ensure that the air you breath, the soil that your children play in, and the water that you drink are safe. We wouldn't like your property values to decline, and returning your environment to a healthful state or preventing it from being unsafe is our responsibility, and this is what we can offer to help protect your property values. As you know, there are other factors which also affect property values such as public perception which unfortunately neither you or we have any control over.

Option 2. If not, I don't know if I can really answer your question about whether I would buy a house here because like other major investments there's many things to consider such as schools, employment, environment, etc., before I could make such a decision. I know that if I were living here or if I had to buy a home here, I would at a minimum want the environment to be safe, and that is the goal of our Agency: to ensure that your environment is safe.

A. This whole situation has not been an easy or pleasant one for you, and we're also very concerned. As to whether I would live or buy a home here, that's usually a very complex question for most situations. But if my only considerations for making a decision were whether the air was safe to breath or the water safe to drink, I would say yes because our Agency's goal is to ensure that it is. As you know, there are other important and personal considerations such as cost, neighborhood, quality of schools, mortgage rates, etc., which most of us take into account before deciding on the purchase of a home. (CR 1,3,4,7)

A. Poor Response: Personally, I wouldn't live here. That's off the record, of course.

A. Poor Response: (You appear to be caught off guard and seem to be searching for an answer but can't give one, or are afraid to. This may give the community a false impression that you wouldn't ever buy a home here because the clean-up will not be effective.)

A. Poor Response: Property values are beyond our control and not our responsibility. I'm sorry we cannot help you.

21. Q. I am considering buying some property here. Given all that has happened, would you buy or recommend buying property here now or in the future?

Underlying Individual Need: This person is concerned about investing his money here, and would like to know if that would be a wise thing to do.

A. Property investments are important transactions requiring careful consideration. I can appreciate your concern. Property investments are also very personal choices. Where I may be willing to invest my money may be very different from where you or someone else might be willing to invest their's. For me to tell you how you should spend your money would probably not be very helpful because I'm not very knowledgeable in that area, nor do I know what criteria you consider important. What I think would be more helpful would be to give you all the information about the hazardous waste problem that we have so that you or another potential buyer or seller can make the most informed choice possible. (CR 1,3,4,7)

A. Poor Response: Sorry, but we don't make those types of recommendations. (Even though this is true, it does not address the individual's underlying need, and may give the impression that you wouldn't recommend buying property here. In the preceding answer, the response was not only honest, but it also offered information that was helpful.)

- **Reminder Note: Underlined answers are examples of "active listening."**