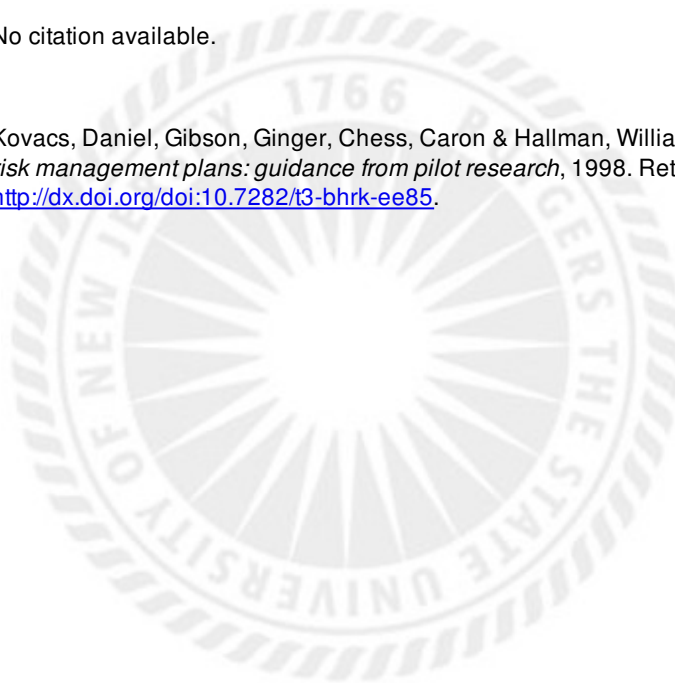


Outreach materials about risk management plans: guidance from pilot research

Rutgers University has made this article freely available. Please share how this access benefits you.
Your story matters. [\[https://rucore.libraries.rutgers.edu/rutgers-lib/59513/story/\]](https://rucore.libraries.rutgers.edu/rutgers-lib/59513/story/)

Citation to Publisher No citation available.
Version:

Citation to *this* Version: Kovacs, Daniel, Gibson, Ginger, Chess, Caron & Hallman, William K.. *Outreach materials about risk management plans: guidance from pilot research*, 1998. Retrieved from <http://dx.doi.org/doi:10.7282/t3-bhrk-ee85>.



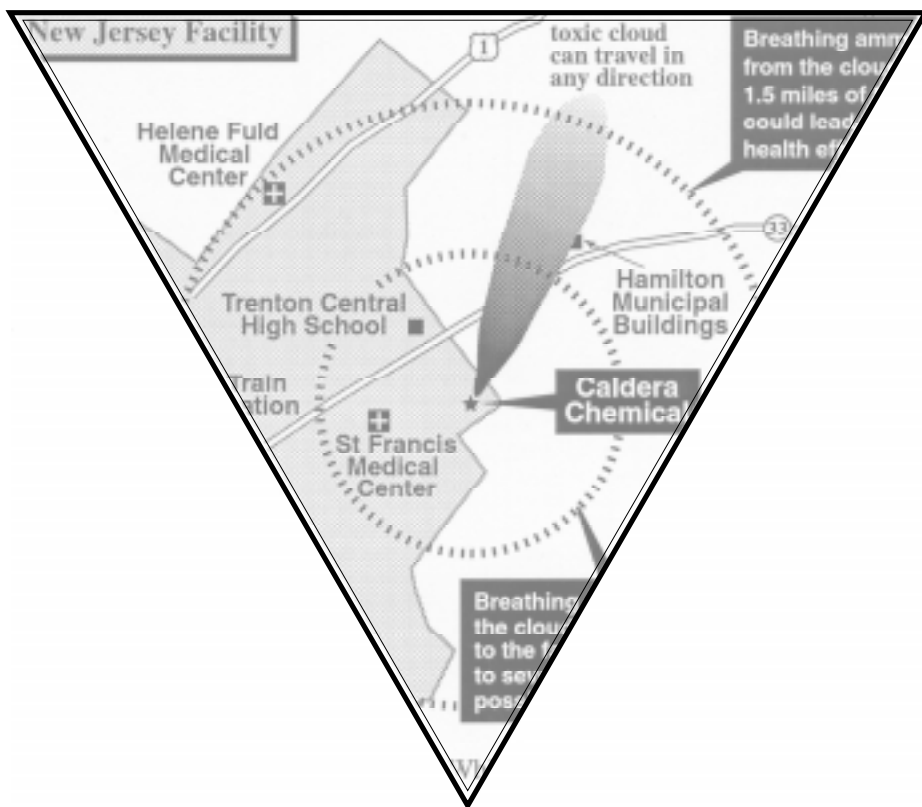
Terms of Use: Copyright for scholarly resources published in RUcore is retained by the copyright holder. By virtue of its appearance in this open access medium, you are free to use this resource, with proper attribution, in educational and other non-commercial settings. Other uses, such as reproduction or republication, may require the permission of the copyright holder.

Article begins on next page

o u t r e a c h m a t e r i a l s a b o u t

Risk Management Plans

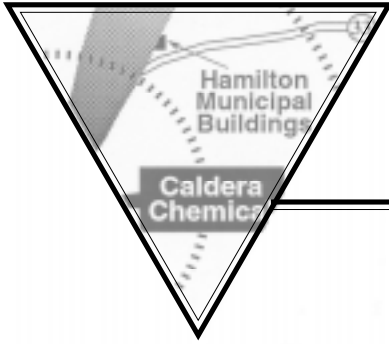
g u i d a n c e f r o m p i l o t r e s e a r c h



**Center for
Environmental
Communication**

by Daniel Kovacs, Ginger Gibson,
Caron Chess, and William Hallman

© September 1998 • All rights reserved



Introduction

MORE THAN SIXTY THOUSAND FACILITIES ARE FACED WITH THE COMMUNICATION CHALLENGE of disclosing by June 1999 their “worst case” scenarios for accidental release of a toxic or flammable gas into the areas surrounding their facilities. Although the rules under the Clean Air Act about developing Risk Management Plans (RMPs) do not require companies to provide data directly to the public, the information will be available through other sources, such as the Environmental Protection Agency.¹

There are a range of predictions about public responses to RMPs. While some industry managers express concern about causing undue alarm, other states with similar laws have not received many requests for information (McNulty et al. 1998). Risk communication research suggests that public response will vary among communities. Local factors such as the operating history of a site and its role in the community will likely be major influences on how RMPs will be viewed (Irwin et al. 1998).

According to trade reports and the Center for Environmental Communication’s (CEC) discussions with 12 industry managers, many companies have decided to release their RMP information directly to the public rather than to have government or activists do so as was often the case in the release of Toxics Release Inventories (TRI) required under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986. Industry decisions to provide information about RMPs directly to citizens also conforms with EPA’s recent suggestions.²

Many companies have decided to release their RMP information directly to the public rather than to have government or activists do so.

Based on our discussions with industry managers, it seems likely that many companies are planning to use brochures to communicate RMP information. Some companies are mailing brochures to every person in the worst-case release area while others are presenting them in community events. Therefore, CEC’s research focuses on public response to brochures and ways to improve them. Due to the small number of people in our study and because the tested brochures were based on scenarios

from a hypothetical plant, the following conclusions should be seen as tentative rather than definitive.

- A brochure can help people understand complex RMP information.
- Those who receive a brochure sent directly by industry may worry less about chemical accidents and may trust industry more than those who don’t.
- Clarifying maps of potentially impacted areas may help people to distinguish the risks at different locations.
- For some individuals involved in this study, brochures we tested didn’t provide sufficient information about accident prevention, emergency response, and self-protection.

- Modifications we made to a basic industry RMP brochure were seen as significant improvements by activists. However, except for clarifying map information the changes did not make a significant difference with a lay audience.
- We do not recommend industry merely adapt the improved brochure developed as part of this research (Appendix 2). All outreach materials should be pre-tested in surrounding communities to ensure that they are relevant and address local concerns and questions.

Methodology

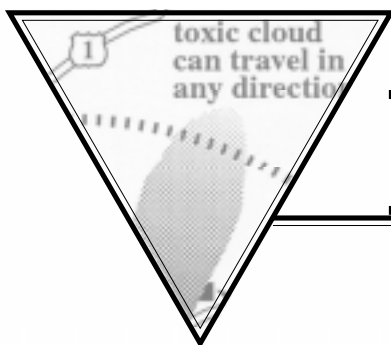
OUR METHODS INCLUDED INTERVIEWS WITH INDUSTRY MANAGERS, focus groups with environmental and union activists, and a questionnaire distributed to lay people. After collecting forty brochures developed by nineteen companies, we designed a mock industry-style brochure focused on a fictional company (Appendix 1). We retained as much of the format, content, and language of the original industry brochures as possible including core RMP information (worst and alternative case scenarios, maps showing impacted areas, five year history of accidents, and prevention activities) and additional information (notification procedures in the event of an accident and self-protective actions, including shelter-in-place instructions). Even though maps are not required by the law, all the brochures we collected contained maps with plumes indicating the distance a gas could travel. To ensure relevance for our test audiences, we localized the maps by including street names and locations suggested by members of the community where brochures were tested.

We chose to include activists in our focus groups because of industry beliefs that activists will play an important role as interpreters of RMP information. We also felt that they were likely to provide us with incisive comments on the RMP brochures. In addition, we sought comments from a Rutgers' staff cartographer and his students on the maps used by industry to show potentially impacted areas. Based on the responses received, we incorporated as many of the suggested changes as was practical (Table 1) and created an improved brochure (Appendix 2).

This improved brochure was tested using a convenience sample of 290 parents of children in a parochial grade school near Trenton, NJ (response rate 69%). This brochure was again localized to a hypothetical plant near the school. As with most pilot studies and a great deal of risk communication research, the survey population used was not representative of the general population (77% of the group were women, 84% of the group were between the ages of 30 and 50, 93% were Caucasian, and 80% of the group had at least some college education). However, this group does represent one segment of the population that would likely be particularly interested in RMP information. Finally, we took our improved brochures back to the activists from our focus groups and asked them how they viewed this improved brochure.

¹ For complete information about the requirements of the law, see EPA's website (<http://www://www.epa.gov/swercepp/>).

² EPA, Communication with the Public (<http://www.epa.gov/swercepp/whatnew.html>).



Results

Industry goals for RMP communication

Most of the industry managers we interviewed were concerned about how to clearly communicate RMP information, as required by law, without unduly alarming readers or eroding trust in industry. One approach suggested by several of the managers was to include additional information in their RMP that is not required by the law, such as a longer accident history, self-protective actions, and notification in the event of an accident. Some emphasized the importance of initiating proactive and ongoing dialogue directly with plant neighbors and other stakeholders in advance of media or government reporting of RMP information. While some managers were particularly concerned about public reaction, others were not, believing that many people are already aware of potential hazards or will simply be uninterested.

Activist responses to the industry-style brochure (See Appendix 1)

Although most activists in our focus groups emphasized the importance of accurately communicating the accident scenarios, they also acknowledged the difficulty in doing so. As with industry managers, some activists thought that the brochures would cause undue alarm, while others felt that most plant neighbors are familiar with the dangers of living near a plant. Most were extremely critical of the content

of the industry-style brochure, which they said devoted too much space to unimportant information. In particular, activists disliked the public relations “spin,” which included superfluous description of operating procedures, discussion of the benefits and uses of the chemical, and reports of the company’s charitable donations. They also faulted the industry-style brochure for not containing adequate information about accident prevention, notification and response.

Some suggested a brochure would inspire more trust if it was developed or reviewed by a neutral third party, such as government or emergency responders. Nearly all criticized the industry-style brochures for

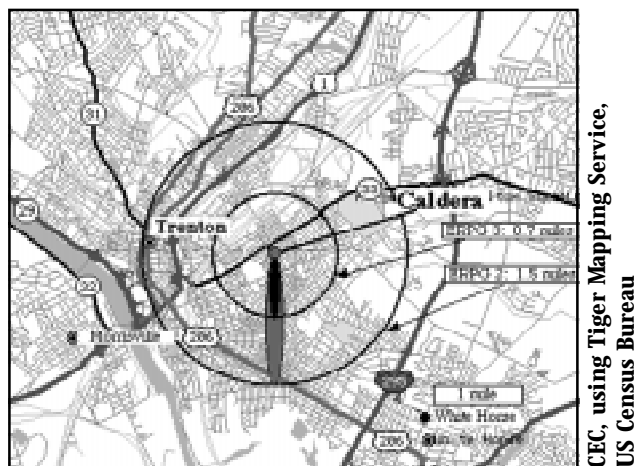
being unclear about what areas could be affected by the toxic cloud and the health effects of exposure. They also stressed that the industry-style brochure didn’t even explain why people would be receiving the information in the first place.

One approach suggested by several of the managers was to include additional information in their RMP that is not required by the law.

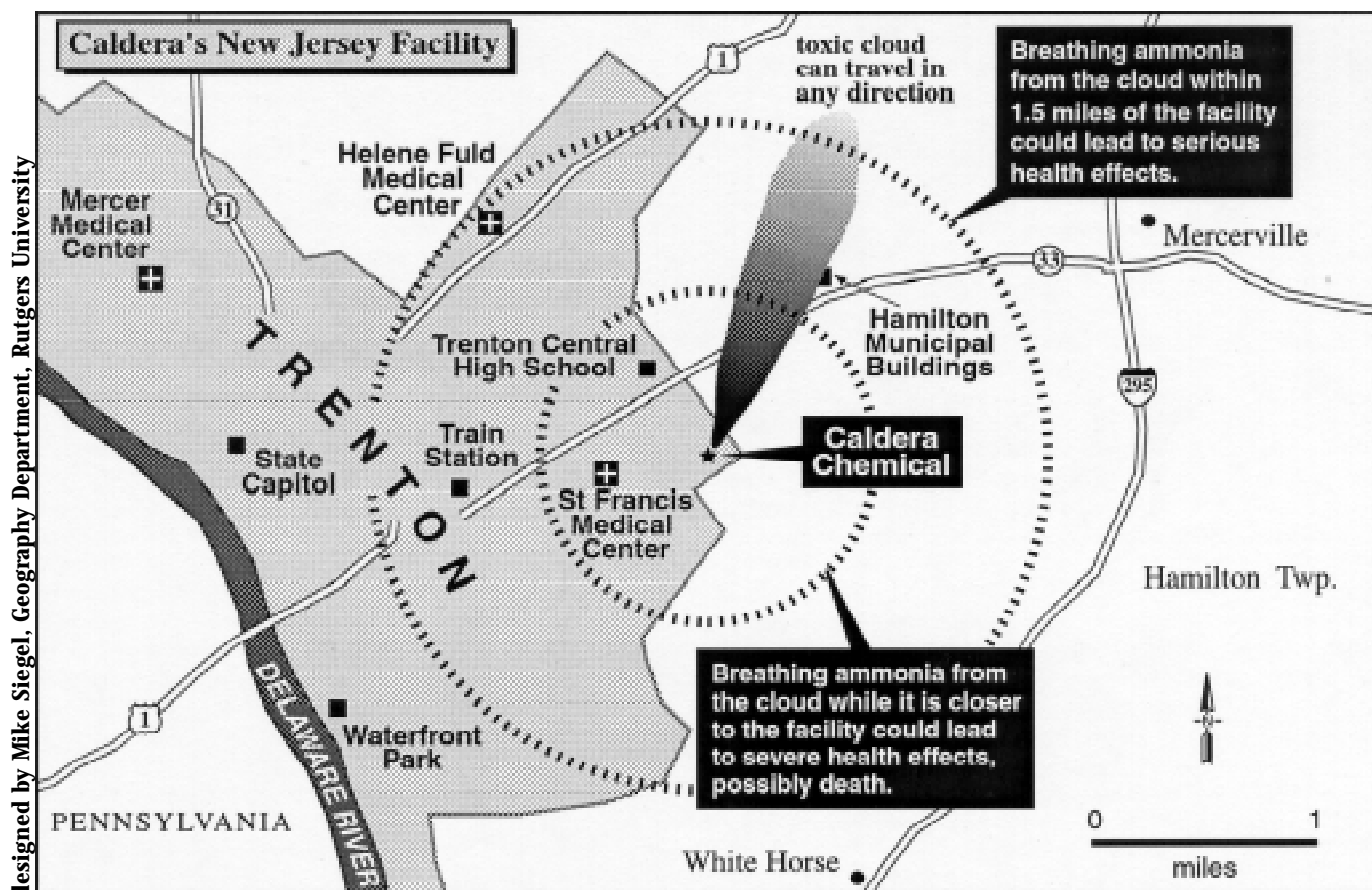
Concerns about maps

Activists who were shown our industry-style maps, and cartographers who were shown ten actual RMP maps published by industry, found the information they conveyed to be extremely confusing. Irrelevant details obscured the maps' messages so much that both groups questioned whether industry designers consciously sought to camouflage the important information in the scenarios. They criticized the maps for using the same font for small towns and large cities, for using scales that made releases look small, and for using acronyms. They also faulted the failure to label important landmarks such as residential areas and facilities with sensitive populations (i.e., schools and hospitals).

Map 1: Industry-style brochure (alternative scenario)



Map 2: Improved brochure (alternative scenario)



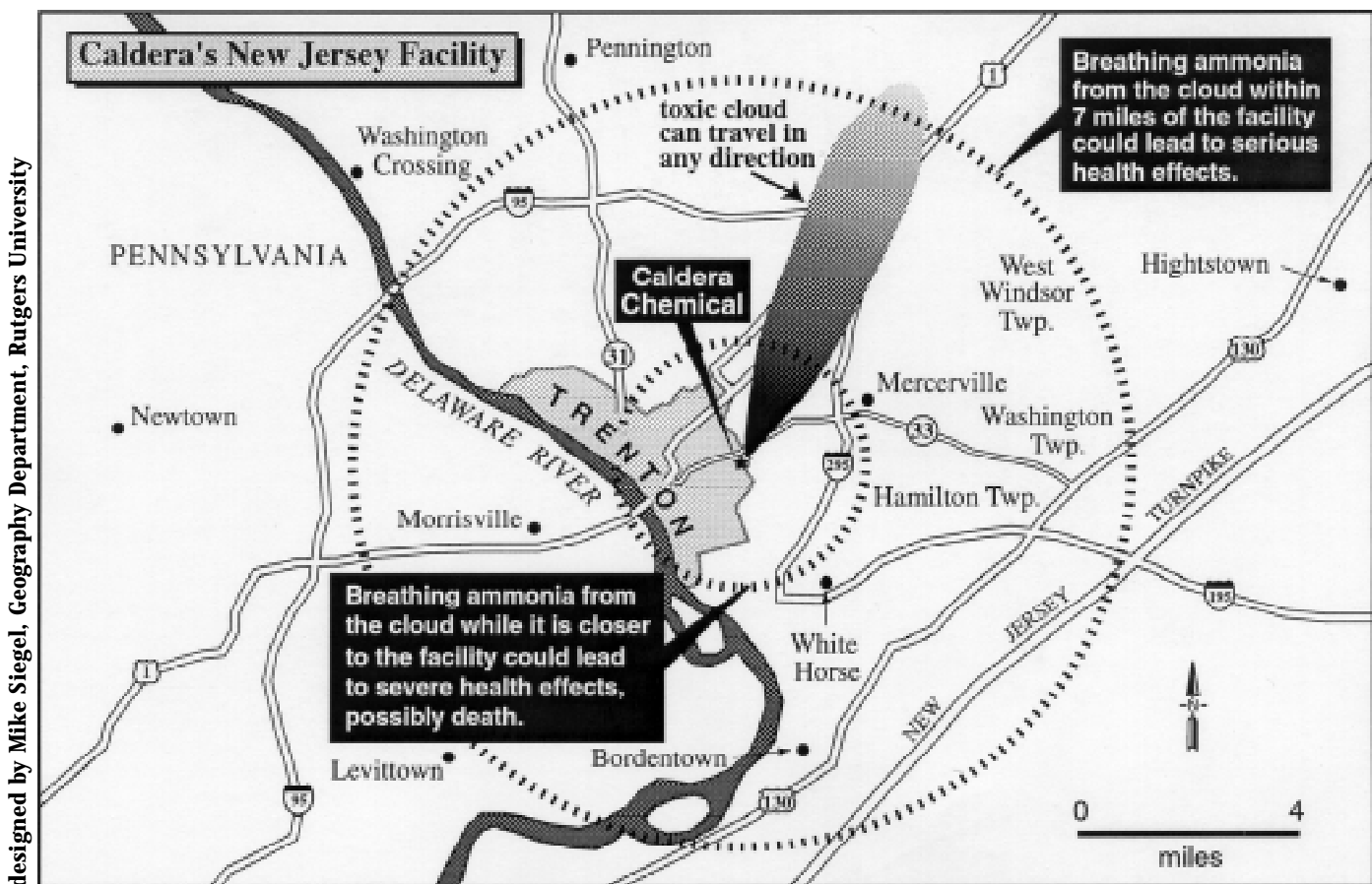
Lay People and Activist Responses to the Improved Brochure

To test the effectiveness of the improved brochure, one group of parents was asked to review the brochure and answer survey questions about perceptions of the chemical industry and chemical accidents. Another group of parents, acting as a control group, did not receive the brochure but was asked to answer the survey. (Subject responses to survey questions are shown in Table 2.) Activists' responses were collected through interviews.

Clarity

The parents in our survey agreed that the purpose of the improved brochure was clear enough that they could explain the information to others. Interestingly, however, they only weakly disagreed with statements that the improved brochure was confusing or that there were things that they did not understand. While the activists felt that the improved brochure was clearer than the industry-type brochure, they felt that there were still elements, such as possible health effects, that needed to be expanded. Further research is needed on how to increase the clarity of this complex information.

Map 3: Improved brochure (worst case scenario)



Content

Compared to those who did not receive an improved brochure, those who received it had a significantly better understanding of self-protective actions such as shelter-in-place, felt more confident about their ability to take such actions, and were more assured that they would receive sufficient warning in the event of an accident. People felt that the improved brochure was useful for industry to send out and that they would read it if they received it in the mail. However, there is room for improvement. We found that respondents wanted to know more about self-protective actions, how they would get warning if an accident occurred and how plants prevent accidents.

Activists' comments on the improved brochure reflected these mixed results. Many suggested that the improved brochure adequately addressed many of their original concerns, but several issues remained to be addressed. They suggested that improvements could be made to better describe public notification and emergency response coordination. They also felt that the concept of shelter-in-place was clear but that people would need additional information before they felt confident about protecting themselves.

Trust

In general, lay people surveyed were neither particularly trustful nor mistrustful of the chemical industry. However, those people who received the improved brochure responded more positively on each measure of trust than those who received only the survey. Activists felt the improved brochure was less self-promotional than the previous industry-style brochure and therefore more palatable if not more trustworthy. In short, facilities that distribute RMP information may increase trust somewhat, however, plant neighbors who have stronger preconceptions or personal experience with specific facilities may respond differently than our study participants (Irwin 1995).

Worry

In general, our lay respondents reported that indeed they did worry about the possibility of chemical accidents. However, those who received the improved brochure which described a 5-year accident history worried less about such a possibility. In addition, those who received the improved brochure consistently felt serious chemical accidents were less frequent (Table 3).

Activists reading our improved brochure reported that it would be difficult to predict how this

Table 1: Revisions made in response to focus group activists and cartographers

We included or modified the following elements

- Explanation of reason for brochure
- Name of contact person on front and back of brochure
- Accident scenarios, prevention, and accident history – on same page
- Expanded explanation of accident scenarios
- Health effects, including potential symptoms
- Local landmarks and major roads on maps
- Label that toxic cloud can move in all directions
- Shaded plume to show decrease in concentration
- Impact zones labeled with definitions, not acronyms
- Clearer definitions of the impact zones
- Highlighted and simplified shelter in place information
- More detailed personal protective actions

Exclusions

- Information perceived as filler or PR (e.g. charitable donations, taxes paid)
- Excessive details that obscure major messages

Table 2: Subject responses to survey questions

Question	Survey Type	Mean	Standard Deviation
Clarity			
The purpose of this brochure is clear. [†]	IB	1.80	1.05
I could explain the information in the brochure to someone else. [†]	IB	1.95	0.96
The information in the brochure is confusing. [†]	IB	3.62	1.01
There are things in the brochure I do not understand. [†]	IB	3.46	1.14
Content			
If there was a chemical release at [Caldera/a nearby chemical company], I would stay indoors with the windows shut and the ventilation off.	IB	1.41*	0.85
	SO	2.41	1.36
I feel that I know enough about how to protect myself in the event of a chemical accident.	IB	2.62*	1.09
	SO	3.97	1.14
I feel confident that if a chemical accident occurred at [Caldera/a nearby chemical company], I would get enough warning to protect myself.	IB	3.02*	0.95
	SO	3.65	1.34
If I received a brochure like this in the mail I probably wouldn't read it. [†]	IB	3.45	1.18
Sending out a brochure like this is probably a waste of time and money. [†]	IB	4.00	1.20
Trust			
Caldera/Chemical companies wouldn't send information out about serious chemical accidents unless they had to.	IB	2.13	0.78
	SO	1.67	1.13
I feel that [Caldera/chemical companies] take adequate measures to prevent serious chemical accidents.	IB	2.36	0.71
	SO	2.53	1.01
I get the sense that [Caldera/chemical companies] are hiding something.	IB	3.68*	1.21
	SO	2.28	1.05
Caldera [Caldera/chemical companies] are probably more interested in public relations than they are in safety.	IB	3.46*	1.02
	SO	2.31	1.29
Worry			
The information in this brochure is frightening. [†]	IB	2.31	0.98
The information in the brochure makes me worried about the safety of the community near the plant. / I worry about the safety of communities near chemical plants.	IB	2.10*	1.50
	SO	1.50	0.78
The possibility that a "worst case" accident could happen at a place like Caldera makes me worried. [†]	IB	2.21	0.98

Improved Brochure (IB)-People receiving the brochures we improved [n = 40]

Survey Only (SO)-People receiving only a survey on perceptions of the chemical industry and of chemical accidents [n = 46]

* Mean responses were significantly different between survey only and the improved brochure groups.

[†] Questions relating specifically to the improved brochure, therefore there are no survey only (SO) responses.

Scale

1=Agree Strongly 2=Agree Somewhat 3=Neither Agree nor Disagree 4=Disagree Somewhat 5=Disagree Strongly

information will affect worry. They suggested, consistent with risk communication research, that such perceptions will be heavily dependent on current perceptions of the individual company.

Comparison to industry-style brochure

In addition to the control group that did not receive a brochure and another group that received our improved brochure, a third group of parents received an industry-style brochure similar to the one used in the focus groups. One of the most significant differences between the industry style brochure and our improved brochure was how the maps identified local landmarks and depicted the dispersion of the toxic cloud away from the plant. When asked to rate the relative risk faced by people at different locations in the event of an alternative case scenario accident, both groups seemed to understand that risk decreases with distance. However, those who received the improved brochure (with the improved map) could more accurately assess the potential risk at specific locations.

The activists indicated that the improved brochure was significantly better than the industry-style brochure we had presented to them earlier. In contrast, the survey of lay people revealed no significant differences between the brochures on our measures of clarity, content, trust, or worry. This does not mean that the adapted industry-style brochure does not need improvement. Indeed activists' feedback strongly suggests that the improvements we made helped to convey RMP information.

Table 3. Subject responses to survey questions regarding accident frequency

Question	Survey Type	Mean	Standard Deviation
How frequent are the following events?			
Accidents like those described in the worst case scenario	IB	4.32*	1.04
	SO	3.71	0.92
Accidents like those described in the alternative scenario	IB	3.68	0.96
	SO	3.57	1.01
Accidents involving a chemical storage tank that releases the entire contents of the storage tank	IB	4.30*	1.08
	SO	3.73	1.07
Accidents involving a chemical storage tank where safety controls don't work	IB	3.97*	1.00
	SO	3.26	0.99
Accidents involving chemicals that harm people in the communities surrounding a chemical facility	IB	3.97	1.00
	SO	3.81	0.91
Accidents involving chemicals that kill or injure hundreds of people	IB	4.18	1.14
	SO	4.16	0.95

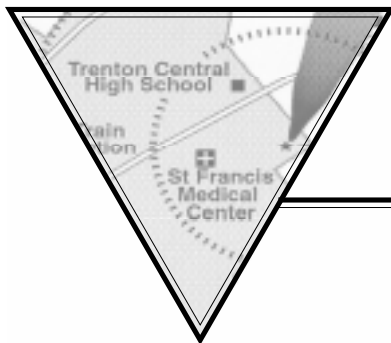
Improved Brochure (IB)-People receiving the brochures we improved [n = 40]

Survey Only (SO)-People receiving only a survey on perceptions of the chemical industry and of chemical accidents [n = 46]

* Mean responses were significantly different between survey only and the improved brochure groups.

Scale

1=Very Frequent 2=Somewhat Frequent 3=Neither Frequent or Infrequent 4=Somewhat Infrequent 5=Very Infrequent



Implications for practice

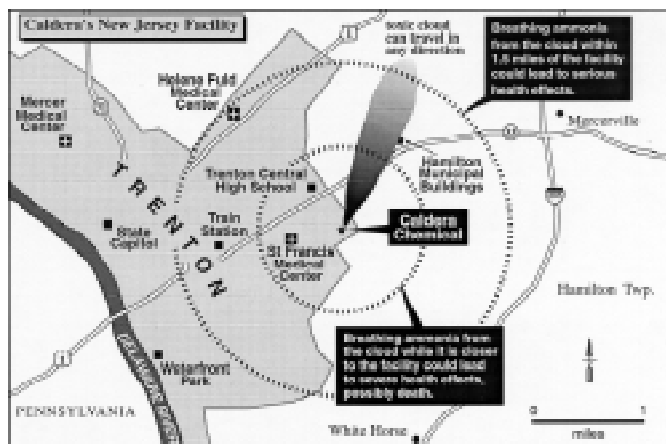
THE FOLLOWING SUGGESTIONS ARE NECESSARILY TENTATIVE because the scenario we used in this research was fictional. As this research was conducted using limited and targeted groups, our findings must be viewed as a starting point. **Brochures should not merely be adapted by facilities.** Instead, an industry brochure created to communicate RMP information should be tested through local focus groups with plant neighbors.

1. Consider distributing information directly to stakeholders to increase your credibility and neighbors' ability to protect themselves in the event of an accident.

This research suggests that those who receive information directly from the company may be less alarmed and more aware of self-protective actions than those who do not receive any information. However, many factors in addition to how and what information is distributed will affect response (Irwin et al. forthcoming).

2. If you choose to include a map, ensure it includes relevant information.

Consider asking local residents for names of key landmarks and roads to incorporate into maps, particularly the alternative case scenario(s) which can accommodate greater detail due to the smaller area covered. In addition, avoid trivial detail and take care to avoid confusing acronyms, map scales and symbols. Explore improving map design by including in the process an expert on developing maps for lay people (Monmonier et al. 1997).



designed by Mike Siegel
Geography Department
Rutgers University

3. Anticipate questions and consider including more information than is required by law.

Activists wanted more information about companies' programs to prevent accidents, potential health effects of exposure to toxic chemicals, and emergency response plans. Response to RMPs will be predicated on a range of factors that vary by facility. For example, if readers are interested or concerned about accidents, a brochure is unlikely to answer all of their questions. Proactive changes in risk management can be an important way to anticipate questions about prevention. Consider making changes in procedures, storage of chemicals, etc. in advance of tough questions about them (Chess et al. 1992).

4. Given the differing needs of the populations the RMP will go to, pre-test materials with your intended audience.

Even though our improved brochure was not significantly clearer to the parents, it was to activists who may serve as interpreters in some communities. In addition, other risk communication research has shown that information which considers readers' needs and interests is more likely to increase their ability to take effective action (Morgan et al. 1992). Have potential readers look at an early draft to point out their concerns about confusing, missing, or untrustworthy information.

References

- Chess, C., A. Saville, M. Tamuz, M. Greenberg. 1992. The organizational links between risk communication and risk management: The case of Sybron Chemicals Inc. *Risk Analysis*. 12(3): 431-438.
- Irwin, A. 1995. *Citizen Science: A study of people, expertise and sustainable development*. New York, NY: Routledge.
- Irwin, A., P. Simmons, G. Walker. Forthcoming. Faulty environments and risk reasoning: The local understanding of industrial hazards. *Environment and Planning A*.
- McNulty, P., L. Schaller, K. Chinander. 1998. Communicating under Section 112(r) of the Clean Air Act Amendments. *Risk Analysis*. 18(2): 191-197.
- Monmonier, M. and B. Johnson. 1997. *Design Guide for Environmental Maps*. Trenton, NJ: New Jersey Department of Environmental Protection, Division of Science and Research.
- Morgan, M. G., B. Fischhoff, A. Bostrom, L. Lave, and C. Atman. 1992. Communicating risk to the public. *Environment, Science and Technology*. 26(11): 2048-2056.
- National Cancer Institute. 1984. *Pre-testing in Health Communications: Methods, examples, and resources for improving health messages and materials*. Washington, DC: National Institutes of Health, NIH Publication #84-1493. NCI Publications (301) 496-6641.

Appendix 1: Industry-style brochure

Risk Management Summary: Ammonia

Caldera Chemical Corporation

Trenton Facility

MCPC

Mercer County Petrochemical Council
Community and Industry Living Safety With Chemicals

This information provided as part of the Mercer County
Petrochemical Council Risk Management Program

BENEFITS OF AMMONIA

Ammonia is a basic building block and is used in the manufacturing of many common products. The largest users of ammonia are the agricultural fertilizer business. Some of the products that are made from ammonia include:

- Textiles (carpets, fabric, clothing etc.)
- Pharmaceuticals
- Dyes
- Packaging for food products

MCPC member companies also use ammonia in various chemical processes and as a safe refrigerant that does not harm the earth's ozone layer.

POTENTIAL HEALTH EFFECTS OF AMMONIA

Small concentrations of ammonia can be extremely irritating to the eyes, throat and breathing passages when inhaled. This irritating property causes us to flee from ammonia before we encounter higher concentrations. High concentrations could cause more serious problems, such as convulsive coughing, difficult and painful breathing, and in extreme cases, death. Contact of the eyes and skin with liquid

ammonia and ammonia solutions is serious, requiring prompt medical attention, if burns develop.

Employees or contractors who work around ammonia take the following extra precautions:

- wearing appropriate safety equipment
- undergoing special OSHA training

WHAT DO COMPANIES DO TO KEEP US SAFE?

MCPC member companies use a variety of safety equipment and procedures to prevent accidental releases. Following are some of the typical safety equipment and systems used at our facilities:

- The Ammonia Institute produces standards for safety regarding the production and handling of ammonia. MCPC member companies follow these standards.
- Automatic shut-off devices and relief valves handle unexpected rises in temperature or pressure.
- Safety controls, including warning alarms, automatic shutdown systems and leak detectors, provide multiple lines of defense.
- Continuous monitoring of pressure in vessels and piping prevents problems.

Regular equipment inspections ensure proper operation.

Staff and contractors receive extensive health and safety training, following OSHA guidelines.

Staff are trained in start-up, operation, loading and unloading, and maintenance of all equipment.

Full investigation of any incident-even small drips or leaks-prevents them from occurring again.

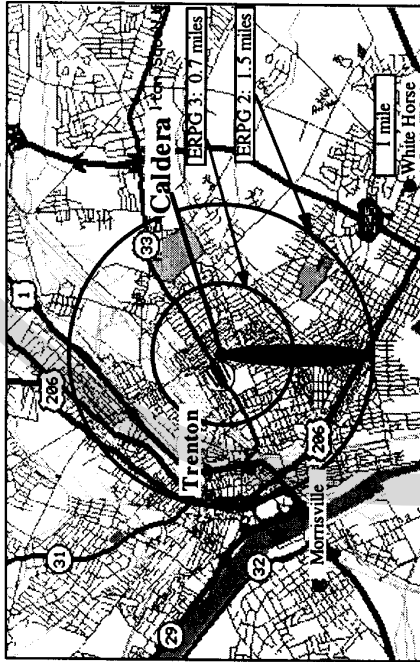
Appropriate permits have been obtained and are maintained.

Routine audits (inspections) are performed by both Caldera and outside agencies ensure correct procedures are followed.

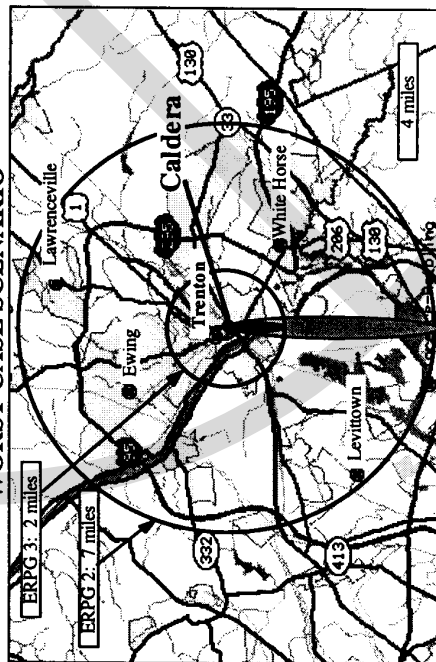
PUTTING IT IN PERSPECTIVE

Worst Case Scenario Release - 92,000 Pounds Largest Actual Release - 150 Pounds
 Alternative Scenario Release - 15,400 Pounds

ALTERNATIVE SCENARIO



WORST CASE SCENARIO



ERPG-2: If exposed to a chemical at this level for one hour, a person could experience some irreversible or serious health effects that will need medical attention.
ERPG-3: If exposed to a chemical at this level for one hour, a person could experience severe or life-threatening health effects requiring hospitalization, or possibly causing death.

FIVE YEAR ACCIDENT HISTORY

There have been no releases of ammonia at the Caldera plant in the past five years that meet the USEPA Risk Management Program (RMP) reporting requirements. The following table is a list of all ammonia accidentally released at this site in the past five years. No releases resulted in any adverse impacts to the community or our employees.

	1992	1993	1994	1995	1996
Releases > 100 pounds	0	0	0	0	1
Releases 10 to 100 pounds	0	0	0	1	0
Releases of 10 pounds or less	1	0	4	0	0

WHAT SHOULD I DO IN A CHEMICAL EMERGENCY?

Sheltering in place is considered to be a proven method for protecting yourself and your family in the event of an accidental release.

As soon as you hear the warning:

1. Go quickly inside the nearest building. (Do not try to make it home, if you are not there. Just go inside a building quickly.)
2. Close all windows and doors.
3. Turn off all air conditioning and heating systems.
4. Close off fireplace and put out the fire completely.
5. If you are in a vehicle and the release is visible, turn off air conditioning and outside air, close windows, and try to avoid going

through the gas cloud by turning on a side street, or stop and go into a building.

6. Tune your radio to a local emergency broadcast station: WBRZ 1460 AM
7. If an evacuation is ordered by authorities (police or fire department), please follow their instructions. Otherwise, shelter in place.
8. If you have trouble breathing, place a wet cloth over your nose and mouth and breathe through it.
9. Call the CAER lines for information: (609) 555-8795
10. The Community Alert Network (CAN) computer will call phones in affected areas.
11. Stay indoors and wait for the "all clear."

EMERGENCY RESPONSE PROCEDURES

To be prepared for potential ammonia accidents, MCPC member companies communicate regularly and work closely with the Local Emergency Planning Committee (LEPC) and other community responders.

Detailed emergency response plans are in place and the LEPC, local fire departments, and other emergency responders have copies of these

plans. These responders, and MCPC employees, perform emergency response drills.

In April of each year, MCPC hosts Responsible Care Week to remind the community about the action to take, should an ammonia accident occur. In addition, a community-wide emergency response drill is performed annually.

For more information, contact Dan Kovacs at (609) 555-8795

Appendix 2: Improved brochure

Accidental release of ammonia:

What is the Worst that Could Happen?

Caldera Chemical Corporation
Trenton Facility

This brochure describes chemical accidents that could affect your community, our efforts to prevent and minimize accidents and the steps you should take in a chemical emergency.

To inform people in nearby communities who may be at risk from chemical production and use, the Environmental Protection Agency (EPA) has asked more than 66,000 facilities to look at some of the chemicals that they have on site and to estimate:

How far toxic chemicals could spread if there were an accident.

Specifically, the EPA has asked that we look at a **worst case accident**, one where a number of things go wrong all at once, and an **alternate accident**, one that is more realistic. At Caldera, the worst case scenario would result from an accident involving our largest storage tank of ammonia. In such an accident, toxic levels of ammonia could spread as far as 7 miles. Though a serious accident involving chemicals has never happened at Caldera, we take safety very seriously. This brochure is intended to raise public awareness that we use chemicals at our facility and to inform you that dangerous chemical releases, while very unlikely, can occur.

For more information:

This brochure is only a summary of the what has been provided to the EPA. If you would like more information please contact Dan Kovacs, Caldera's Emergency Response Manager, at (609) 555-8795.

Accident Scenarios

The worst case accident scenario. At Caldera, we use ammonia as an ingredient in the agricultural fertilizers we make. The accident which could affect people the farthest away from our plant would result from the release of about 17,000 gallons of ammonia held in our largest storage tank. We have such a large tank to make sure that we don't run out and to reduce the number of ammonia deliveries.

Worst case assumptions

- Everything held in a tank is released
- Safety controls don't work
- The chemicals are released very quickly
- There is no strong wind or moderate breeze to quickly dilute the vapors

Such a release would create a cloud of toxic vapor near the ground that travels away from the plant in the direction of the wind. In a light wind, the cloud will stay highly concentrated for about 2 miles.

If you are exposed to the cloud within this distance, you could experience serious problems, including extreme eye, throat and breathing irritation, convulsive coughing. Exposure to this cloud could cause death if it does not pass quickly or you cannot get to fresh air.

As the cloud travels away from the plant it will spread out, becoming less concentrated and less harmful. If you are exposed to the cloud between 2 and 7 miles from the plant, you could experience some serious or irreversible health effects that require medical attention and may prevent you from seeking shelter. Beyond 7 miles, nearly all people could be exposed to the cloud for up to an hour with no irreversible or serious health effects which would keep them from seeking shelter.

The alternate accident scenario. At Caldera, a more realistic accident scenario begins with a tear in a hose moving ammonia from a delivery truck to our storage tank. In this accident up to 2,800 gallons of ammonia could be released. This release would spread in much the same way as the worst case accident. Within one and a half miles some serious health effects could occur, especially in the area immediately near the plant. Beyond one and a half miles the effects of the toxic cloud would not keep you from seeking shelter. While this accident is more realistic than the worst case it is still unlikely.

Alternate accident assumptions

- Is more likely to occur than the worst case accident
- There are impacts which reach beyond the plant boundary
- Safety controls work
- The release happens more slowly
- Typical weather conditions exist

What We Do To Prevent Accidents Like These

At Caldera we take safety very seriously. We use a variety of safety equipment and strict procedures to prevent releases and to reduce the impact of releases which do occur. Some examples are:

- Safety controls such as leak detectors, warning alarms, and automatic shutdowns.
- Regular equipment inspections and maintenance to ensure proper operation.
- Investigation of all incidents, even small drips or leaks, to improve our procedures.
- Routine audits of processes both by Caldera and outside agencies.

Five Year Accident History

The EPA requires companies to report releases of 18 gallons or more. In the past five years at Caldera, we have had only one reportable release (27 gallons from a valve failure on a transfer hose). We also had 4 smaller releases of less than 2 gallons. These releases were detected and contained through safety controls and procedures and had no adverse impacts on the community or our employees. While some accidents do occur, we take great efforts to ensure that they are as small and as infrequent as possible.

What Should You Do in a Chemical Emergency?

Accidents like the worst case and alternative scenarios are unlikely, but they can happen and it is important for you to know what to do. These accidents can occur quickly and for the first few minutes of any emergency you will be on your own and you will need to rely on your senses.

If you are close enough to hear the warning signal from the plant (one long continuous siren blast), or if you smell or sense an strong chemical odor, protect yourself by immediately going inside, and staying inside the nearest building, home or vehicle.

This is called "Sheltering in Place" and is the best way to protect yourself and your family in the event of an accidental chemical release. It works because the outside air does not mix quickly with the air in these spaces when they are closed up. This protects you from the most toxic vapors as the cloud passes.

Sheltering In Place

If you are outdoors:

- Go inside the nearest building quickly (Don't try to make it home)
- Close the windows and doors
 - turn off ventilation systems (heat, air conditioning or fireplace)

If you are in a vehicle:

- Stay inside
 - close windows and doors
 - turn off the air conditioning or heat
- Try to avoid driving through the vapor cloud (they are usually visible)

Once you are inside, stay inside until you hear the "all clear," which is two short blasts of the siren.

Important: *If you have trouble breathing, place a wet cloth over your nose and mouth and breathe through it.*

For information during the accident:

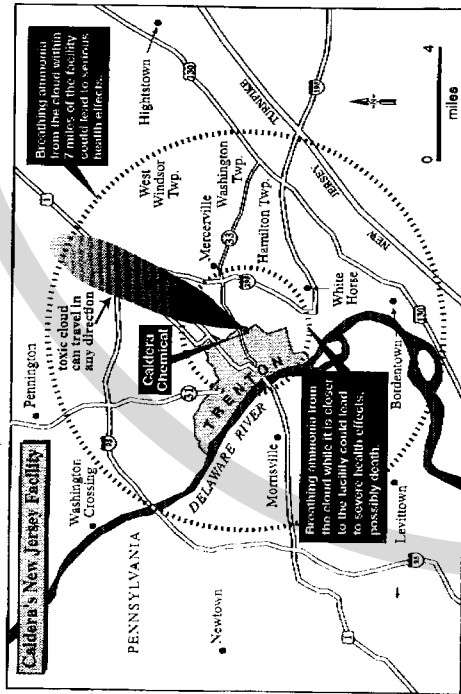
- Listen to the radio or TV. Tune to a local station and wait for instructions.
- Call the Caldera emergency hotline at (609) 555-2237.
- Await instructions from authorities (police or fire department) who will notify you if an evacuation is necessary.

Preparing for Emergencies

Caldera and other nearby chemical companies have formed the Mercer County Petrochemical Council (MCPC) to plan responses to emergencies which cannot be dealt with by one company alone. These plans are reviewed with the Local Emergency Planning Committee (LEPC) and other local emergency responders like the fire and police departments, and hospitals. MCPC companies have annual emergency response drills to prepare for accidents such as those described in this brochure.

For more information:

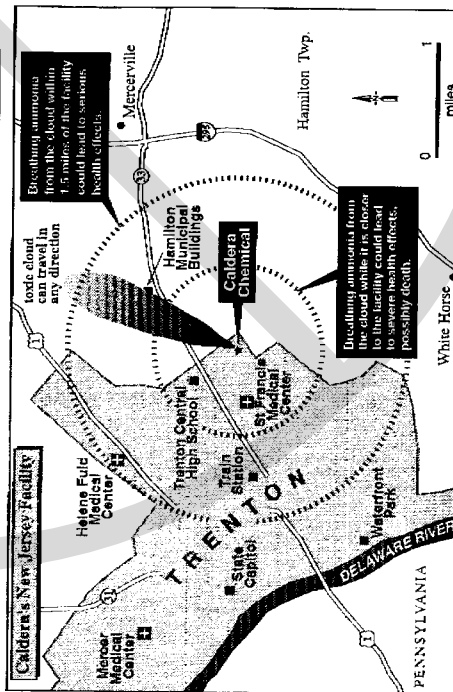
To learn more about these accident scenarios and our planning and prevention activities, contact Dan Kovacs, Caldera's Emergency Response Manager, at (609) 555-8795.



Worst Case Accident Scenario

Putting it into Perspective

Worst Case Scenario Release:	17,000 Gallons
Alternate Scenario Release:	2,800 Gallons
Largest Actual Release from this facility:	27 Gallons



Alternate Accident Scenario

Brochures should not merely be adapted by facilities without pre-testing.

outreach materials about
Risk Management Plans
guidance from pilot research

Copyright 1998, Daniel Kovacs, Ginger Gibson, Caron Chess, William Hallman, Cook College, Rutgers, the State University of New Jersey.

All Rights Reserved.

Daniel Kovacs Research Associate, Center for Environmental Communication
Ginger Gibson Research Associate, Center for Environmental Communication
Caron Chess Director, Center for Environmental Communication
William Hallman Associate Professor of Human Ecology

Design and layout Nadene Rehnby 

Acknowledgments

This research was funded by the Hazardous Substances Management Research Council, a National Science Foundation Industry/University Cooperative Center and an Advanced Technology Center of the New Jersey Commission of Science and Technology. We'd like to thank the industry managers, parents and activists who participated in this research. Thanks also go to BJ Hance, John Bresland, Carolyn and John Whittaker, Our Lady of Sorrows School, Elizabeth Ann Komar, Connie Hallman, CEC staff and researchers, our industry and academic reviewers, and Mike Siegel and his cartography students. For a list of other risk communication publications and the availability of more information on this study, see the Center for Environmental Communication's website at <http://aesop.rutgers.edu/~cec/>



Center for Environmental Communication
Cook College, Rutgers University
31 Pine Street, New Brunswick, NJ 08901-2883

phone: 732-932-8795 fax: 732-932-7815

web: <http://aesop.rutgers.edu/~cec> e-mail: cec@aesop.rutgers.edu

RUTGERS UNIVERSITY'S CENTER FOR ENVIRONMENTAL COMMUNICATION conducts research and provides training workshops on how to improve communication about environmental issues. CEC has gained international recognition for responding to environmental communication dilemmas with research, training, and public service.

CEC is committed to sharing what it is learning about environmental communication. Prices represent only the cost of reproduction, postage, and handling. Individuals and nonprofit organizations unable to pay the prices listed may request a reduced charge in writing.