

**Informational Regulation of Industrial Safety – An examination of the
U.S. "LOCAL EMERGENCY PLANNING COMMITTEES" ¹**

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ABSTRACT : A major trend in the regulation of industrial risks to human health and the environment is the provision of relevant information to (and the empowerment of) all stakeholders and risk bearers. This paper provides a concrete look at one of the key items in implementing this "regulation by information" in the United States: the so-called LEPCs or *Local Emergency Planning Committees*. We summarize the literature on the subject, report on some interviews we made at selected LEPCs in the states of Vermont and Maryland, and present preliminary figures from a recent survey we just completed of more than 200 LEPCs. The ending sections also contain some international comparisons and an appraisal of the actual LEPCs.

KEYWORDS : Chemical plant safety, Community participation, US Emergency Planning and Community Right-To-Know Act, Clean Air Act, Local Emergency Planning Committees (LEPCs), Risk Management Program

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1. Introduction

A recent study conducted by the U.S. Chemical safety Board (CSB) estimated that, on average, 55 000 chemical incidents happened every year between 1987 and 1996 in the United States, or more than 150 per day. On average, chemical accidents kill about 250 people in the U.S. alone every year. These figures obviously tend to enhance the value of industrial safety.

Since the Bhopal disaster and Basel incident of the 1980s, a major trend in the regulation of industrial risks to human health and the environment has been to empower all stakeholders and risk bearers. Eighteen years ago, for instance, the United States government introduced the legal concept of “community right-to-know,” which stipulates that all residents be entitled to access specific information concerning the hazardous chemicals in use or in storage in their respective neighborhood.² In 1990, furthermore, section 112 (r) was added to the *Clean Air Act* (CAA), asking the U.S. government's Environmental Protection Agency (EPA) to set requirements for facilities to reduce the likelihood and severity of major accidental chemical releases. The EPA soon launched its *Risk Management Program*, in which about 60 000 facilities had to convey their respective Risk Management Plan to the public (via the EPA's web site).³

The means identified by the 1986 *Emergency Preparedness and Community Right-to-know Act* (EPCRA) included the mandatory creation of organizations at both the state (the State Emergency Response Commissions – SERCs) and local levels (the Local Emergency Planning Committees – LEPCs), whose tasks would be to develop emergency plans in case of catastrophic releases of toxic chemicals and to supply information about covered facilities. There are now approximately 4000 LEPCs in the United States. It is widely believed that these are key items in fostering cooperation between federal and state agencies, the chemical industry and the general public, thereby making the EPCRA, the RMP, and the general informational regulation of industrial risks effective. In the aftermath of the AZF plant explosion in Toulouse,

² In Europe, the *Seveso II Directive* also granted the public greater access to information concerning industrial hazards and plant safety. And for some years the *Canadian Council of Major Industrial Accidents* has recommended extensive and sustained information transfers through joint committees involving people from industry as well as from local communities.

³ Following the terrorist attack of September 11, however, those Risk Management Plans have been removed from the EPA's website.

which on September 21, 2001, left 30 people dead and more than 2500 injured, the French government is now considering the creation of local committees of information and prevention similar to the LEPCs around each *Seveso* facility.⁴ In Québec, Canada, a new law on civil protection adopted in December 2001 and its subsequent bylaws will also promote the implementation of such committees.

The purpose of this paper is to provide a concrete look at the functioning of the LEPCs. Our presentation is based on many documents available on the Internet and in the literature on informational regulation, on personal interviews carried out at selected LEPCs in the states of Vermont and Maryland, and on preliminary results from a recent survey we just completed of more than 2900 LEPCs.⁵ The following section first summarizes the underlying rationale of right-to-know regulation. Section 3 next presents our main findings. Section 4 contains an appraisal of the actual LEPCs. And section 5 concludes the paper.⁶

2. Why Regulating by Informing?

Many arguments support a right-to-know approach to regulating environmental risks. They respectively relate to ethics, epistemology, economics and public policy.

- *From an ethics perspective*, it is necessary to distinguish between a risk that someone is informed about and willing to bear, like that a (possibly insured) car driver takes when entering a highway, from a risk that is generally unknown and unsuspected (for some time period, at least), like the exposure to a potential epidemic of mad-cow disease that red-meat consumers in Europe have only recently become aware of. In a democracy, the former is morally superior to the latter. Each risk bearer must then be enabled to assess and decide for him or herself the hazards he or she wants to face, which means in particular that all the relevant information be made available.

⁴ Material damages from the Toulouse explosion amount to more than 2 billion US \$. By all accounts, this industrial accident is now viewed as the worst one that ever happened in France.

⁵ We sent a questionnaire to 2935 LEPCs, 858 through e-mail and 2077 per regular mail. A total of 288 LEPCs responded, which gives a response rate of about 10%.

⁶ The reader who wishes to benchmark the U.S. experience against that of other countries, namely Canada and France, may also consult Appendix I.

- *From an epistemology viewpoint*, past experience reveals that science-based assessments of environmental and industrial risks often convey a significant margin of error, for they must commonly cope with missing data and involve accordingly subjective judgments with respect to permissible analogies, extrapolations and methodology. Moreover, science-based scenarios of catastrophic events would often constitute rough approximations of what may truly happen (especially when there can be human casualties), because any catastrophe generates (almost by definition) a politicized, media stirring, highly emotional, and therefore unpredictable situation. It thus seems reasonable to require that risk assessment ultimately incorporate as many relevant and well-founded opinions as possible, which presupposes open questioning by informed stakeholders.

- *For economists*, informational regulation is usually justified by invoking the so-called "Coase Theorem" (from the Nobel-prize winner Ronald Coase), which says that socially optimal risk sharing can obtain if all stakeholders can negotiate at no transaction costs. This assertion underlies the use of tradeable permits for controlling pollution. When it comes to technological risks, it supports open disclosure of information in order to foster the parties' mutual trust and limit wasteful conflicts. As the current pace of innovation increases, furthermore, and new products and processes having an ambiguous impact on human health and the environment are constantly being introduced, it stresses that risk management is most likely to yield efficient outcomes if the risk bearers themselves are well-informed.⁷

- Finally, many recent studies, conducted in some developed and emerging countries (Indonesia, for example), illustrate that the information of local communities puts effective pressure on companies to significantly reduce the risks to human health and the environment. Most owners of hazardous facilities do indeed care about their reputation and want to have a good relationship with their neighbors. The latter may

⁷ The implementation of health and environmental risk disclosures raises of course many questions, pertaining for instance to the scope and content of reports, the quality and credibility of information, the design of communication strategy, and whether disclosures should be voluntary or mandatory. The recent paper by Sinclair-Desgagné and Gozlan (2003) represents a first attempt (in environmental economics) to address these issues. This model is summarized in Appendix II.

then act as "surrogate regulators," thereby lowering the enforcement costs of safety regulation.

To fulfill its objectives, however, a right-to-know approach presupposes that the disclosed figures remain credible and of good quality. Relevant information must then be organized, formatted, and (especially after 9/11) made available without compromising on security. This is where nonprofit, independent, and representative bodies like the LEPCs are expected to play a key role.

3. What do LEPCs do?

What role do LEPCs actually play in informational regulation? This section first sketches the legal framework of LEPCs. We next turn to their actual *modus operandi* and draw some international comparisons.

Our basic sources are several existing surveys conducted at various universities and research centers.⁸ Although these were made before September 11th, 2001, and are essentially descriptive, they provide valuable information about respective staffing, activity portfolios, available resources, and training programs of LEPCs, and about their common relationship with the EPA, state agencies, industrial firms, local communities and citizens. This information is now supplemented by systematic interviews done at some selected LEPCs in Vermont and Maryland, and by a home-made survey seeking to understand how much attention was recently allocated to risk communication and hazard reduction.

3.1 *The legal framework*

On October 17, 1986, a Federal legislation enacted the *Superfund Amendments and Reauthorization Act* (SARA). A major part of this law was Title III, the *Emergency Preparedness and Community Right-to-know Act* (EPCRA), which was a direct reaction to the Bhopal disaster. The EPCRA seeks, first, to provide a basis for each local

⁸ These surveys have been conducted by The George Washington University in Washington, by the National Institute for Chemical Studies in Charleston and by the Graduate School of Public Affairs of the University of Colorado at Denver.

community to develop suitable *ex ante* emergency measures, and second, to entitle people to identify and quantify the chemical hazards present in their neighborhood.

Section 301 of the EPCRA mandated the creation of organizations at both state and local levels that would foster cooperation between local communities and the industry. State governors were henceforth required to set up and appoint a state commission - the SERC - that had in turn to divide the state into "Local Emergency Planning Districts" and appoint a *Local Emergency Planning Committee* (LEPC) in each one of them. Each LEPC would include representatives of: (1) elected state and local officials, (2) law enforcement, (3) emergency management (civil defense), (4) firefighting, (5) emergency medical services (first-aid), (6) health care, (7) local environmental groups, (8) hospitals, (9) transportation personnel, (10) broad-casted and printed media, (11) community groups, and of course (12) the owners and operators of targeted facilities.

The LEPCs constitute thereby the primary linkage between citizens, the industry and the various government layers. They must

- (1) prepare a comprehensive emergency response plan, submit it for approval to their respective SERCs, and update it each year. Such a plan would have to include the name and location of hazardous materials, procedures for immediate response to a chemical accident, and ways to notify the public about what to do and whom to get instructions from;
- (2) organize and store the information about hazardous chemicals which is supplied by local facilities;
- (3) make this information available to the public upon request; and
- (4) increase community awareness about, and safety from, hazardous materials, by means of public releases, formal training, general simulations and drills.

In 1990, section 112 (r) of the *Clean Air Act Amendments* (CAAA) asked the EPA to set requirements inducing hazardous chemical facilities to decrease the likelihood and severity of major accidents. Under the subsequent *Risk Management Program* (RMP), covered facilities must now provide hazard assessments, which include worst-case scenarios, alternative release scenarios, a five-year accident history, a prevention program, an emergency response program, and evidence of an effective

management system to oversee the implementation of RMP elements. Compliance with those requirements was first expected by June 21, 1999.

Although it did not explicitly mention the LEPCs, section 112(r) has led to a significant extension of its role, from a planner of emergency response to a key player in the *prevention* of industrial accidents (EPA, 1998). But because the significant impact of an accident is local, effective accident prevention activities must of course have a local focus. Delegating the responsibility of developing local emergency plans to the LEPC ensures that communities will develop personalized, need-specific, and effective emergency plans. Indeed, in designing the Risk Management Program, the US Congress and the EPA anticipated that public scrutiny would help regulate the behavior of hazardous chemical facilities to a greater extent than regulatory requirements alone.

To make the EPCRA and RMP effective, the LEPCs are supposed to constitute a formal linkage between citizens, the industry and the government, receiving information from local industry, using this information to prepare an emergency response plan for the community, submitting this information to their respective SERC, and responding to public inquiries about chemical hazard and releases. The following figure gives a summary of this.

To be sure, the LEPCs are given three key roles in accident prevention:

(1) They collect the data submitted by covered facilities. Industry must be involved in prevention. Concretely, every regulated facility is, among other things, responsible for reporting HAZMAT inventories (quantities and locations of hazardous chemicals) annually to the LEPC, and for supplying a material safety data sheet (MSDS) or a list of hazardous chemicals and an annual report of toxic chemicals releases to the EPA and the State. Moreover, those facilities covered by the emergency planning provisions must designate a facility emergency coordinator to assist the LEPC in emergency planning. The LEPCs must also be given updated emergency information as soon as practically possible. They may initiate civil action against the owner or the operator of a facility for failing to supply information under Section 303(d) or to submit Tier II information under Section 321(e)(1) (EPCRA, Public Law 99-499).

(2) The LEPCs are also chief actors in emergency response: Section 303 of the EPCRA required the LEPCs to prepare comprehensive emergency response plans for their community by October 1988, to submit them to their respective SERC and to

update the plans annually. The EPCRA also demanded the LEPCs to increase community hazardous materials safety through responder and emergency medical personnel training and the coordination of emergency measures with local communities. The EPCRA thereby established the LEPC as a basic “forum” for neighborhood discussions and for local action on matters pertaining to hazardous material management.

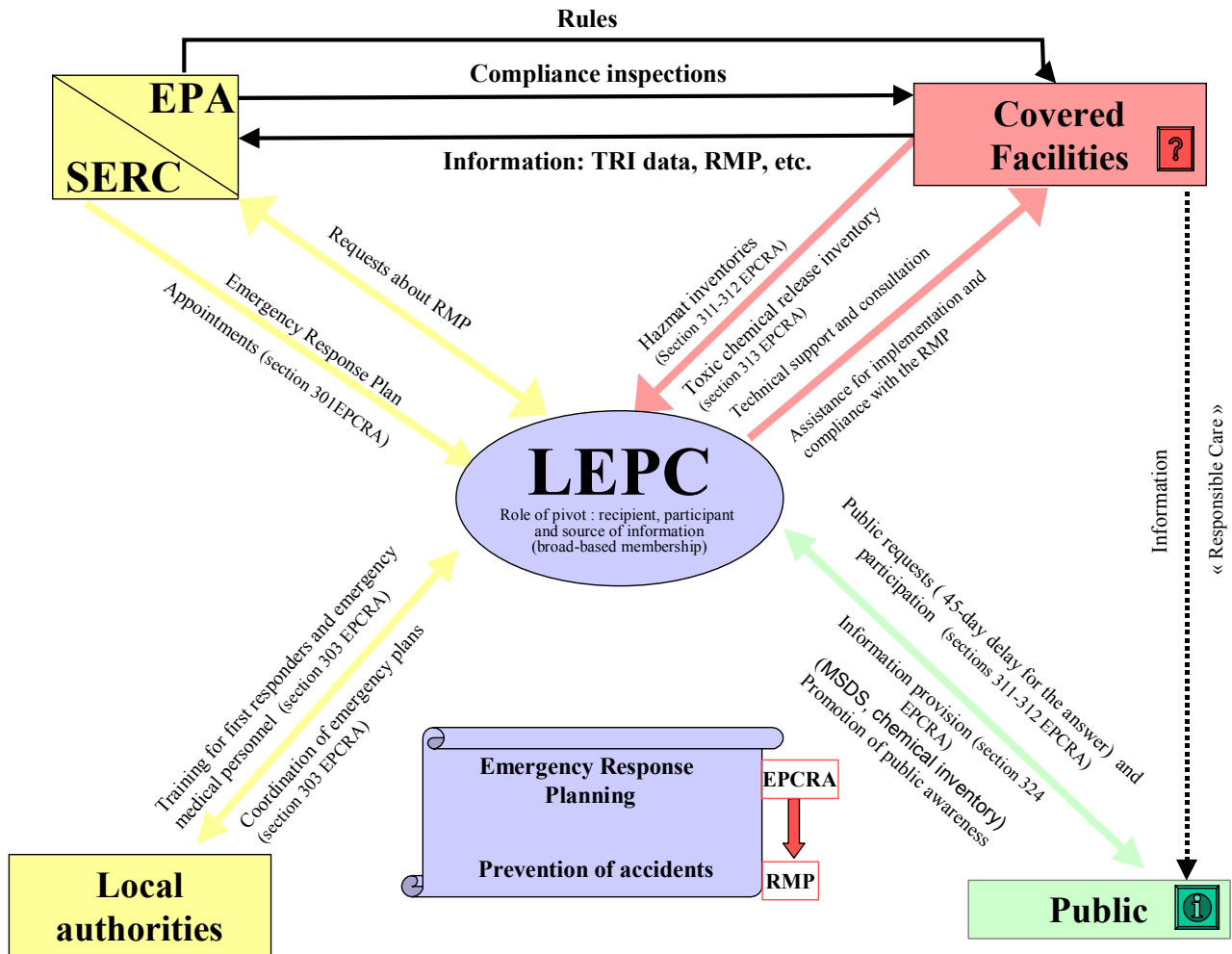


Figure 1. The LEPC and its landscape

(3) The LEPCs are a source of information to the public and local governments. They have the obligation to make the information concerning risks in their district's covered facilities available to the public upon request, and to consequently set and publicize procedures to handle those requests. An LEPC must respond to a request for

Tier II information no later than forty-five days after reception of the request (EPCRA, Public Law 99-499). It is deemed more efficient to encourage people's access to an effective single information window instead of letting them inquire each facility.

Following this description of the LEPCs' legal framework, let us now turn to what exactly LEPCs do in practice. Our aim is to understand how much attention the LEPCs actually devote to both outreach/risk communication and the promotion of hazard reduction, or to what extent the LEPCs have met their expected role up to now.

3.2 *Modus operandi*

Let us first look at the geographical distribution and the composition of LEPCs.

- *Geographical distribution of LEPCs* (see Table 1). Each state currently averages about 81 LEPCs, organized by counties, large towns or relatively large portions of territory. There are significant discrepancies across states, however: twenty states have less than 50 LEPCs, while four states - New Jersey, New Hampshire, Massachusetts, and Texas – have more than 200. According to our survey, the average number of facilities reporting to an LEPC (that is to say, facilities subjected to SARA Title III and facilities subjected to the RMP) is 109, but there can also be significant differences as the number of facilities per LEPC may go from 1 to 2552. The correlation coefficient between the number of LEPC and the number of RMP facilities is only 0,0121.

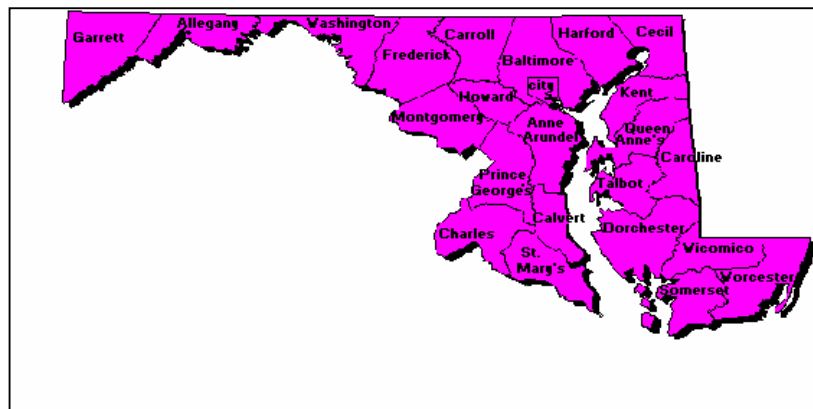


Figure 2 : Distribution of LEPCs in the state of Maryland

Clearly, the actual distribution of the LEPCs reflects that of hazardous facilities and is meant to insure that emergency planning is done at the most useful level, but the approach varies across states. The state of New Jersey, for example, uses city and township lines as boundaries to define emergency planning districts. In Maryland (see Figure 2), districts are defined per counties plus two cities - Baltimore (a highly industrialized city) and Ocean City (well exposed to floods and hurricanes), given the greater risks that these two cities must bear.

States	Number of LEPCs	Number of RMP facilities	States	Number of LEPCs	Number of RMP facilities
Alabama	68	247	Montana	56	128
Alaska	19	28	Nebraska	84	627
Arizona	16	132	Nevada	17	42
Arkansas	77	193	New Hampshire	225	16
California	6	1067	New Jersey	564	128
Colorado	52	251	New Mexico	32	71
Connecticut	157	57	New York	58	233
Delaware	4	41	North Carolina	97	341
Florida	11	575	North Dakota	53	353
Georgia	16	392	Ohio	87	512
Hawaii	5	30	Oklahoma	80	392
Idaho	43	82	Oregon	1	140
Illinois	103	1077	Pennsylvania	67	410
Indiana	92	541	Rhode Island	9	28
Iowa	72	1007	South Carolina	46	216
Kansas	105	815	South Dakota	62	124
Kentucky	117	233	Tennessee	95	245
Louisiana	64	360	Texas	272	1424
Maine	16	37	Utah	30	87
Maryland	25	128	Vermont	10	10
Massachusetts	351	95	Virginia	114	193
Michigan	90	269	Washington	47	265
Minnesota	7	567	West Virginia	54	83
Mississippi	82	185	Wisconsin	72	321
Missouri	90	420	Wyoming	23	77

Table 1. Geographical distribution of the LEPCs⁹

⁹ The number of LEPCs per State was found on the following website of the EPA : <http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/lepclist.htm>. Moreover, the number of RMP facilities per State was found on the following website : <http://d1.rtknet.org/rmp/>

- *Composition.* The 1994 Nationwide LEPC Survey by Adams, Burns and Handwerk locates the median size of a “functioning” LEPC at 20 members.¹⁰ Our own survey now locates the median size at 26 members.

According to Adams (1998), “While Congress perhaps thought requiring a broad base of members for the LEPCs would automatically create community-wide interest in their tasks, the reality is that many LEPCs are managed by county sheriff, fire departments, and industry representatives, who, in many states, were managing the emergency response function before Title III became law.” This observation corroborates a previous one by Hadden (1989), who reported that “SERCs and LEPCs are dominated by emergency response personnel rather than by citizens or environmental personnel.” This imbalance in LEPC composition is also confirmed by our survey. Indeed, the groups that are the most represented are industry representatives, (an average 7 members per LEPC), fire departments (4 members), and elected state and local officials (3 members) per LEPC; on the other hand, the citizens and the media are the least significant, with less than 2 members per LEPC on average.

Let us now consider how the LEPCs actually perform their mandated duties - i.e. enhancing accident mitigation, emergency planning, public training and the coordination of respondents, together with informing the stakeholders about industrial risks. Since this paper mainly seeks to examine how informational regulation works in practice, more attention will accordingly be put on the latter.

- *First task: coordination of emergency planning.* The 1994 Nationwide Survey estimated that 81% of LEPCs had submitted a complete emergency response plan - i.e. one dealing specifically with planning, training, and exercising as continuous and intertwined activities - to their respective SERC. At that time, another 11% of LEPCs had “almost” set their own plan.

Exercises, simulation and drills appear to be the best (yet most expensive) means to foster public awareness and involvement, as well as to articulate emergency plans and procedures, and to assess the preparation of all interested parties. As we noticed in our survey, emergency exercises are widely used by the LEPCs since only 6.3% of the

¹⁰ The term “functioning” in that nationwide survey refers to those 79% of all LEPCs that are “quasi-

respondent don not perform them. The average frequency of emergencies simulations is 1.4 per year. There are two main types of exercise, referred respectively as tabletop and full-scale.¹¹ The purpose of a tabletop exercise is to have participants practice problem solving and resolve questions of coordination and assignment of responsibilities in a non-threatening format, under minimum stress. In 1999, for example, the Harford County LEPC built a reduced yet exhaustive model of the district that covered one hundred square-meters. All buildings (houses, schools, hospitals, plants, warehouses, etc.), roads and landscape features (hills, parks, etc.) were represented. Different scenarios were then simulated, in front of LEPC members as well as all residents willing to attend. This experiment was widely described as a success. It certainly represents a valuable intermediary step towards a functional or full-scale exercise. The latter can be used to test an emergency plan under a still higher degree of realism; however, it mobilizes significant physical and human resources (e.g., State and local Emergency Operation Centers, incident command posts, mass care centers, medical facilities equipment staging areas, and lay citizens) and involves an increased level of stress. Yet, in 1996 the state of Florida's District 3 LEPC, for example, conducted such an exercise. It simulated a leakage of chlorine from a one-ton container located between two schools.¹² A few minutes after the incident, Gainesville Fire Rescue staff discussed with the Hazmat team to coordinate an intervention. The former subsequently undertook to knock down the noxious cloud, and the Hazmat team rushed on the spot to mend the leaking container before proceeding to decontaminate the area. Students, teachers and other exposed people had meanwhile been explained the ongoing situation and brought to protective shelters. According to our survey, 50.2 % of the LEPCs use the two main types of exercise - tabletop and full-scale; 75.3% arrange a table-top exercise while 68.6% organize a full-scale one each year.

active”, “compliant”, or “pro-active”; excluded are the remaining 21% that are inactive.

¹¹ Several guidebooks, training and evaluation documents currently exist to support exercise planning and making. Frequently used ones are the Federal Emergency Management Agency (FEMA)'s "Hazardous Materials Exercise Evaluation Manual," and NRT- 2's "Developing a Hazardous Materials Exercise Program " which is available on the internet (See <http://ntl.bts.gov/DOCS/254.html> for the entire guide).

¹² For more on this, see <http://ncflepc.org/exercises/xrsz96gv.html> .

○ *Second task: risk communication.* A common way to reach out to people is through **public meetings**. These have the advantage of being inexpensive and of allowing direct interaction between the interested parties. In order to enhance public participation, such meetings are usually advertised through local media (i.e. newspapers, brochures, and local television). According to our survey, the average frequency of LEPC meetings per year is 6.2, and a proportion of 84% of these is advertised. Some LEPCs hold public meetings jointly with the targeted facilities, in order to bring stakeholders closer to their respective local plants and to convey RMP information more effectively. At the Whatcom County LEPC in the State of Washington, for example, three advertised public meetings were recently held, where the dean of the Huxley College of Environmental Studies provided a broad overview of the RMP process and intent; people were next allowed to look around and meet with attending local facilities personnel.¹³ As might be expected, however, meeting frequency generally correlates with LEPC activism and compliance with the mandates of SARA III, as well as with an LEPC's having or planning to have computerized data inventories. In their 1997 study, Adams, Morgan and Viana identify nevertheless a positive trend in the frequency of meetings, which suggests increasing LEPC activism.

Another popular channel is of course the **Internet**.¹⁴ This medium constitutes a key instrument to quickly reach a large number of people without having to figure out time and location constraints. Hence, many LEPCs now have a website. In accordance with our survey, 28% of the respondents use a website to reach to and inform the public before September 11th, and a little more after September 11th (29.7%). Such websites are accessible to a variety of users with differing needs (see Viridescent Inc., 2002). For instance, people may visit an LEPC website to get information about what to do during an emergency situation, how to get real-time information when there is an accident, how to handle household hazardous materials, whom to contact at their respective LEPC,

¹³ It is worth noticing that this process was meant exclusively for local residents: the Whatcom County LEPC systematically refused to allow non-residents in.

¹⁴ According to the Department of Commerce, more than half of America's households currently have an Internet connection. The study *A Nation Online* from the U.S. Department of Commerce, which uses census data to track internet usage, reports that 143 million Americans, or 54% of the population, were using the internet as of last September, up 33% from three years ago. Two million people were going online for the first time every month. And among younger people Internet usage is even higher.

and what are the upcoming meetings or exercises schedules.¹⁵ For example, on the website of the Waltham LEPC¹⁶, one can view the emergency response plan of the town and information on the facilities that manufacture, use, store, sell, or otherwise handle hazardous materials. Webpages provide facility contact information, a listing of chemicals and their CAS numbers, and a listing of populations within one half mile that could be impacted by a release. Following those listings is a map showing the location of the affected populations within a half-a-mile radius. Some facilities have additional information pages because of the number of different chemicals they handle. Figure 3 shows an example from this website.

2.1.01 Updated 02/15/2002

Acton Metal Processing Corporation SIC:
SIC: 3672

41 Athletic Field Road Waltham 02451

Facility Phone: 781-893-5890 Facility Fax: 781-647-4226

Lat/Long: 320/4695 Dun & Brad: 1046408

Facility Contact

Martin Flagg	General Manager	781-893-5890
Ruppert Flagg	Owner & President	781-893-5890

Mailing Address

PO Box 671 47 Athletic Field Rd Waltham MA 02451

Owner/Operator: Acton Metal Processing Corporation

Chemicals: CAS #

Hydrofluoric Acid	7664-39-3
Sulfuric Acid	7664-93-9
Sodium Hydroxide [Liquid]	1310-73-2
Nitric Acid	7697-37-2

<u>Special Populations</u>	<u>Address:</u>	<u>Population:</u>	<u>Phone:</u>
Chapel Hill Chauncy Hall School	785 Beaver St	474	781-894-2644
Plympton School	20 Farnsworth St.	372	781-314-5760
Piety Corner Nursing Home	325 Bacon St	44	781-894-5264
Waltham Child Care	764 Main St	55	781-899-2070
Waltham Day Care	50 Church St	51	781-899-0531
Waltham Boys & Girls Club	20 Exchange Street	280	781-893-6620
Waltham Police Department	155 Lexington St		781-314-3600
Waltham Fire Department	175 Lexington Street		781-893-4105
Waltham Emergency Communications	161 Lexington Street		781-893-4105

Figure 3. An exhibit from an LEPC website

¹⁵ Such information can be found on the websites of several LEPCs, such as Maryland's Harford County LEPC (<http://www.co.ha.md.us/lepc/>) or Texas's City of Deer Park LEPC (<http://www.deerparklepc.org/>). The latter also provides special information for children, parents and teachers.

¹⁶ See at <http://www.walthamlepc.org/>

Businesses, on the other hand, would likely visit an LEPC website to know what emergency response resources are available to the business community, where to get “Tier II” inventory forms and how to complete them, what are the current reporting requirements and contacts in case of accidents and toxic releases, and how to get involved in LEPC activities. The media, finally, would likely visit an LEPC website to find out whom to contact and what/how to communicate with the public in case of an emergency.

Information brochures, finally, are a standard way for an LEPC to also reach the public. For example, at the end of each year Maryland's Harford County LEPC and Vermont's Addison County LEPC send a free new calendar to all district members, which contains summary information about local industrial hazards and the risks associated with different chemical substances; also included are the meeting dates of those associations involved in emergency planning, basic instructions for emergency situations, and a map showing where industrial accidents could happen. Such a calendar is not costless, however. Our survey found that about 40% of the answering LEPCs use brochures as a way to reach the public. After September 11th, we noticed a slight reduction in the use of brochures, TV/radios and newspapers but an increase in the use of the Internet and public meeting.

An additional activity that is worth mentioning is the mailing list lepc@list.uvm.edu, created by and for LEPCs Chairpersons in order to keep them abreast of any law or guidelines changes and to enhance technical assistance and the transfer of best practices. One LEPC Chairman, for example, once used it to make the following request: "(...) We are now in the early stages of planning a tabletop exercise and I'd like to hear any stories, tips or would appreciate any guidance or training resources regarding this subject. I am in the process of putting an orientation together for our LEPC members so they can better understand what will be happening." This e-mail quickly elicited many helpful hints and references to key documents.¹⁷ This mailing list doesn't exist anymore but it was replaced by other ones like NASTTPO-mailing list or the environment news service (ENS). The National Association of SARA

¹⁷ Such as the one entitled, "Developing a Hazardous Materials Exercise Program: A Handbook for State and Local Officials," that had just been set by the EPA Region VI and the U.S. Trade and Commerce Department.

Title III Program Officials, or NASTTPO, is made up of members and staff of State Emergency Response Commissions (SERCs), Tribal Emergency Response Commissions (TERCs), Local Emergency Planning Committees (LEPCs), private industry, and various federal agencies. Membership is dedicated to working together to prepare for possible emergencies and disasters involving hazardous materials. The IAEM-list is sponsored by the International Association of Emergency Managers and is designed to provide a public forum for emergency managers to exchange ideas, thoughts, problems and solutions that relate to the emergency management profession. There is also another example of mailing list, the *LEPC Information Exchange*¹⁸, to allow LEPCs to learn about what other LEPCs are doing nationwide, for facilities, responders and the public. The LEPC Information Exchange also volunteers much of its time to promote information exchange to, from and among LEPCs nationwide. The goals of the LEPC Information Exchange are:

- To allow LEPCs to learn about what other LEPCs are doing nationwide, for facilities, responders, and the public;
- To provide LEPCs with outreach ideas and contact information;
- To provide information on conferences and training; and
- To provide LEPCs with recent regulatory information.

In general, however, it seems that the LEPCs receive few information requests from the general public. The 1994 Nationwide Survey estimated that many (41%) had received no public inquiries and a mere 25% had received more than six inquiries. Our survey reveals a similar situation: in the year preceding September 11th, 52% of the respondents had received no public requests, and a mere 50% did receive some request after this. Among those which usually receive requests, nevertheless, we noticed a slight increase in numbers after September 11th. So before September 11th, an average LEPC received 2.84 requests per year while it would receive 3.81 requests a year after the catastrophe happened.

Public inquiries may concern the meaning of some technical words or expressions, the overall risk figure emerging from complex data, the various scenarios described in the Risk Management Plan, the interpretation of the community hazard

¹⁸ See their website : <http://www.lepcinfoexchange.com/>

map and its vulnerability zones, the possible health effects associated with exposure to hazardous substances, etc. Requests at the Harford County LEPC, for instance, pertained more often to emergency response and facilities risk assessment (36 requests per year) than to MSDSs - material safety data sheets (only 10 requests per year). Many LEPCs ask for written requests only.¹⁹ People may also be required by law to come to the LEPC's office, show an identification document (ID), and pay a fee if the information they seek is for commercial purposes.

○ *Extended tasks.* In 1995, a one-day focus group conducted by the National Institute for Chemical Studies with a sample of LEPCs coordinators, industry personnel, citizens and community lobbies revealed that the expectations raised by the EPCRA extended far beyond the minimum requirements of the law. The list of “should-do” responsibilities included *pro-active* identification, analysis, and especially communication of industrial hazards. According to the National Institute for Chemical Studies’ study (2001), several LEPCs are therefore undertaking some tasks to encourage hazard reduction that go beyond legal requirements, such as

- (1) helping to identify facilities covered by RMPs,
- (2) assisting facilities, mainly smaller ones, to design and submit their respective RMPs,
- (3) supporting public disclosures,
- (4) providing a forum in which local plants industries present their respective RMPs to each other and exchange information on safety programs,
- (5) surveying companies to find out what changes were necessary for compliance with the RMP,
- (6) participating in community fairs to promote hazard reduction and encourage public awareness.²⁰

According to Adams, Morgan and Viana (1997), furthermore, 34% of the LEPCs use EPCRA data for zoning and land-use planning. And our more recent survey finds that 23% of the LEPCs are involved in land-use planning.

¹⁹ In the state of Arizona, for example. For more details, see <http://www.azleg.state.az.us> under title 26, chapter 2, article 3.

²⁰ For examples of LEPC pro-activism, see Appendix C, *National Institute for Chemical Studies*, 2001.

An illustration of point (2) is the Harford County LEPC's assistance to small facilities in completing their Risk Management Plan and in submitting it to the EPA. The Harford County LEPC also currently supports facilities in risk assessment and auditing. Item (5) could mean in fact that an LEPC takes part in the compliance audits of facilities. They could thereby provide advices and help to the facilities about risk management. Indeed, 35.2% of the LEPCs in our survey are involved in inspecting and/or auditing of large businesses and 29.4% in inspecting and/or auditing of small ones.²¹

3. An Appraisal

Across the United States, the operation and effectiveness of LEPCs vary widely. A single LEPC can cover an entire state or be centered on only one city. Some LEPCs are well funded through state, local or industry contributions while others have none. The current status of America's LEPCs cannot be generalized as either utter failure or phenomenal success. In many rural areas, LEPCs exist in name only; at the other end of the spectrum, some LEPCs have integrated emergency response plans and display some very high technical sophistication within a narrow range of skills.

The Adams, Burns and Handwerk (1994) nationwide survey gives a list of ten key provisions to evaluate an LEPC's compliance with the law. An LEPC should have:

- (1) an LEPC Chair,
- (2) an Emergency Coordinator,
- (3) an Information Coordinator,
- (4) members representing at least 12 of 13 specified stakeholders,

²¹ Our survey indicates differentiated LEPC involvement across large and small businesses. LEPCs involvement is greater with large businesses, 56.5% and 62% of them being respectively involved with large firms in conveying chemical hazards information to the public and in reducing chemical hazards, while the figures for small and medium enterprises are respectively 48.6% and 54.4%.

²³ The Rich, Conn and Owens (1993) report concludes that "most LEPCs in our study have focused on the technical aspects of their job and have not made a concerted effort to bring hazardous materials issues to public attention. This is quite understandable given the constraints under which they labor. They generally run entirely on volunteer effort and have little or no independent budget or staff. Their mission has been defined primarily in terms of developing a technically adequate emergency response plan . As a result, they have few members with extensive background in public relations, citizen participation or communications. Most make risk communications a low priority and do not know how to go about obtaining public involvement even when it occurs to them to attempt to do so."

- (5) regular formal LEPC meetings,
- (6) regular publicly advertised meetings,
- (7) an emergency response plan submitted to the SERC,
- (8) a plan incorporating at least 9 of 10 key SARA III elements,
- (9) a plan that has been reviewed in the past year,
- (10) and published newspaper notice that the plan and local hazardous substances data are publicly available.

The Adams, Burns and Handwerk (1994) survey also proposes five criteria to assess an LEPC's activism:

- (1) whether it has simulated an emergency during the past 12 months,
- (2) whether its emergency plan was updated during the past 12 months,
- (3) whether its plan takes natural hazards into account,
- (4) whether it meets at least on a quarterly basis,
- (5) and whether it uses its EHS data to make hazard reduction or prevention recommendations to local governments or the industry.

Based on this, the survey found that one fourth of the LEPCs strictly complied with their legal mandates and even took numerous proactive steps that went beyond the minimum required by the law. Although they were not as proactive, most other LEPCs were either highly compliant (16%) or mostly compliant (39%) with the law. However, a significant proportion (21%) of LEPCs - disproportionately more in less populated rural areas - are inactive or, if once active, are now idle. The National Institute for Chemical Studies (1995) generally corroborates this picture: at least one fourth of the LEPCs do not comply with minimal requirements to simply make right-to-know data available to the public upon request, but an equally significant percentage are being quite proactive in interacting with the public.

This heterogeneity and the significant proportions of both impressive successes and blatant failures can be attributed to a number of causes (Adams, 1998). First, there might be some natural resistance to transparency: for example, industry representatives who, along with emergency planners, dominate most LEPCs, do not generally welcome public scrutiny of their work in managing hazardous chemicals. Second, companies already working with other risk management programs, such as the Chemical

Manufacturers Association's CAER, sometimes prefer these programs (for example, the CAER puts the emphasis on safety measurements rather than on the amounts and types of chemicals in use). Third, most LEPCs consider emergency response and planning, not prevention, to be their most important task and have little inclination, time and budget for what they often see as peripheral duties.²³ Fourth, the LEPCs follow the leadership of their respective SERCs, so a given LEPC may not be able to organize drills or simulations, for example, because of the grants awarded for this purpose by its SERC are too small.

Clearly, a large majority of LEPCs do not take full advantage of existing means of communication to reach the public. In all surveys, public communication tends to be their weakest area. The following is a list of sensible explanations.

- *Lack of time.* LEPC members are generally volunteer people holding an outside full-time job. Time consuming public relation operations are thus often unfeasible. As revealed by our survey, 21.2% of the LEPC responded that lack of time was their major problem in developing the emergency response plan.

- *Lack of expertise.* Two types of expertise are usually scarce among LEPC members: technical expertise and communication expertise. According to the National Institute for Chemical Studies (2001), several LEPCs expressed the belief that they are limited in their ability to encourage facilities to reduce hazards because they lack the necessary engineering knowledge or expertise to identify how chemicals or processes in a plant could be changed. According to another study from the state of Colorado (Adams, 1998), few LEPC members have an extensive background in public relations, social dynamics, and citizens' participation. Consistent with our survey, about 20% of the LEPCs replied that there is not enough expertise among their LEPC members.

- *Lack of chemical threats.* According to Adams, Burns and Handwerk (1994), perceived lack of actual chemical threats was singled out by 34% of LEPCs as the reason for their inactivity. It is worth noting, for instance, that LEPCs in areas that have already had toxic releases in the past five years are 10 to 15% more likely to have updated their plans, based on vulnerable zone hazard analysis, than LEPCs located in areas with no recent accident history (Texas A&M University's Hazard Center, 1992).

- *Lack of financial support.* 38% of those interviewed in the Adams, Burns and Handwerk (1994) survey identified inadequate financial support as their main concern. Several LEPCs wrote that they needed the “resources to go with the mandates.” Only 42% of the functioning LEPCs actually have an operating budget. According to our survey, half of the answering LEPCs have an average annual budget lower than \$2700, and among them 28% have no budget at all. On average, the annual budget averages \$15 103. This shows again the large discrepancies among the LEPCs. According to Adams, Burns and Handwerk (1994), some LEPCs draw direct funding from local governments (34%) and a few from local industry (14%). Our own survey reveals that an average of 18.4% of the funding comes from the county or the town, 18% from other grants, 15.4% from the state, 14.2% from the EPCRA fees, 7.1% from the SERC and 5.6% from industry. The National Institute for Chemical Studies (2001) recently reported that funding is basically not available for hazard reduction activities, even in states that have assumed 112 (r) delegation.²⁴

Public apathy. Nearly all the LEPCs contacted through interviews or surveys point out that public apathy towards local chemical hazards made it difficult to generate support or demand for hazard reduction. In Adams, Burns and Handwerk (1994), 67% of the surveyed LEPCs said they were inactive because of the indifference of their local community. Many blamed their small population base for this. According to Adams (1998), for example, in the state of Colorado there is apparently a rather small level of public interest in emergency planning (50% said there is little interest, 40% reported some interest and only 10% indicated a great deal of interest), and in the potential dangers associated with the presence of hazardous chemicals in the area (40% said there is little interest, 20% reported some interest). As revealed by our survey, 8.5% of the answering LEPC responded that public apathy and a lack of involvement from the public was their principal problem in developing the emergency plan and moreover 9% of the answering LEPC finds the fact that members of LEPC are all volunteers is also a great problem to develop the emergency plan. Some LEPC chairpersons attribute this to

²⁴ This brings up a more fundamental problem: there is no federal funding of the LEPCs or the SERCs, which are therefore quite short in resources to carry out their EPCRA-mandated responsibilities (National Institute for Chemical Studies, 2001).

“(…) the many other facets of life people are busy with and the idea that the public trusts them to do their job, as well as their experience that people typically become involved in local issues when they have a monetary stake in the outcome. People must see a correlation between their safety or quality of life before they take an interest in the dangers posed by chemicals in the community.” According to the National Institute of Chemical Studies (2001), “reasons for this apathy varied widely, but it was generally believed that either the public did not perceive the risk from chemical hazards to be great, or they believed the government was taking care of managing these risks and therefore the public does not need to worry about it. As evidence of this attitude, nearly all of the LEPCs reported little or no public attendance at RMP rollout events and few or no requests for RMP data or any other hazard information.” During our interviews in Maryland and Vermont, we were also told that few people attended the public meetings organized by their LEPC. The 9/11 terrorist attack seems to have somewhat changed this situation, however: no citizen showed up at a public meeting organized by the Addison County LEPC at the beginning of 2001, but a similar event held on November 1st attracted sixty citizens! According to the National Institute of Chemical Studies (1995), “the most significant factor predicting involvement by community interests (environmental, neighborhood, universities and labor) is a higher number of facilities in the area. To a much weaker degree, having recent transportation accidents or contamination incidents are positively related to more community interest membership on LEPCs.” To be sure, a quarter of the LEPCs in our survey mentioned that a local accident in their community had changed public perception: for the Somerville LEPC (MA), it was a phosphorus trichloride spill in 1980 which entailed the evacuation of 25 000 people; for the Mohave County LEPC (AZ), it was a butane tank car explosion; for the Live Oak County LEPC (TX), it was on July 9,2001 a fire and explosion at a local refinery.

Community involvement therefore seems to be the most difficult aspect to organize and control. Because getting the community involved in emergency planning and prevention does offer significant benefit - greater awareness of the local emergency plan, development of an emergency plan that accurately addresses the community's specific needs and concerns, and increased legitimacy for funding local government

entities, LEPCs must strive to devise more creative channels to convey information on chemical risks to the public.

5. Concluding remarks

“Information regulation is any regulation which provides to affected stakeholders information on the operations of regulated entities, usually with the expectations that such stakeholders will then exert pressure on these entities to comply with regulation in a manner which serves the interests of the stakeholders” (Kleindorfer and Ordts, 1998). This paper considered one particular implementation of informational regulation in the United States - the *Local Emergency Planning Committees*.

Our overall appraisal of the LEPCs, as far as informational regulation is concerned, is a mitigated one. On the one hand, a fair proportion of LEPCs seems to be working effectively and to have met expectations in terms of promoting public awareness and involvement; furthermore, the fact that other countries are also seeking to implement similar devices at home may indicate that this approach to practicing informational regulation is right and doable. On the other hand, there is considerable heterogeneity in performance across LEPCs, as an equally significant proportion of them still faces minimal public interest. Clearly, the actual process is a learning one which is subject to trial and error. Further creativity and effort need to be deployed vis-à-vis the transfer of best practices across LEPCs and the design of effective two-way communication channels with and between stakeholders.

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Appendix I: International experiences

Recent international experiences on the informational regulation of industrial risks may also contribute original benchmarks and perspectives on the workings of LEPCs. This subsection focuses on two such experiences currently occurring in Canada (Québec) and in France.

- **The Québec CMMIs**

In 1993, the Canadian government created the *Canadian Council of Major Industrial Accidents* (CCAIM) to deal with the prevention and mitigation of industrial risks. At that time, municipalities were traditionally responsible for their citizens' safety in case of a natural or industrial disaster, while firms concentrated mainly on compliance with safety and health regulations in the workplace. In this context the CCAIM launched some special committees – the CMMIs (*Comité mixte municipal-industriel*) - staffed jointly by municipalities and industries to coordinate prevention and emergency planning, and to develop consistent risk communication. The aims are to promote the safety of workers and citizens altogether, and to therefore decrease property and environmental damages simultaneously, reduce response time, reduce the costs and duration of accident recovery, and foster the confidence of municipal or industrial personnel and of lay citizens. These committees are *not* mandatory, however. They may typically include representatives from municipalities, hazardous facilities, local citizens, the Ministry of Transportation, and the Ministry of Health.

The urban community of Montréal has four CMMIs. Among them, the CMMI of eastern Montréal was the first organization of its kind in Canada. It is composed of personnel from ten of the largest industrial companies operating a plant in the area, together with representatives from municipal, provincial and federal government agencies and from the community. Like a U.S. LEPC, it informs the local community of any identified potential risks and checks that effective procedures are in place to deal with emergencies. A recent simulation of toxic release and intervention based on the current means lead the committee members to formulate several recommendations, of which some – such as the installation a siren able to alert the whole neighborhood - have been implemented.

Created less than a year ago, the CMMI of Saint-Laurent is another Canadian version of an LEPC. It has asked the facilities it covers to document potential accidents. Based on the supplied data, it plans to make careful simulations and set fine-tuned emergency plans for the whole community.

Most of the Québec CMMIs are not that pro-active, however. Yet, the new *Civil Protection Act* (Bill 173) promulgated on December 20, 2001, by the provincial government imposes general obligations of prudence and foresight on all hazardous facilities and requires them to report on their respective hazards and on the specific safety measures they implement. Section III, Art. 55, of this Act's Chapter IV stipulates, for instance, that: "Local and regional authorities must take part in information efforts so that citizens may become involved in the pursuit of the objectives of this Act, in particular by disseminating advice on safety measures (...), and by taking part in committees or information sessions organized in conjunction with businesses." It is thus quite reasonable to expect that subsequent bylaws will grant further responsibilities to the CMMIs.

- **France's DRIREs and CLICs**

The Council Directive 82/501/EEC – better known as the *Seveso Directive* – was adopted in 1982. After the major industrial accidents of the 1980's, this directive was amended twice. In 1996, finally, the so-called *Seveso II Directive* replaced the initial one. Its aim is two-fold. First, it seeks to prevent as much as economically and technically possible all major industrial accidents involving dangerous substances. Second, it wants to limit the consequences on humans and the environment of any such accidents. Like its American counterpart, the Seveso II Directive entitles the public to information and consulting services concerning identified local industrial hazards. Governments of states pertaining to the European Union, for instance, must provide anyone that might be affected by the leakage of some hazardous substance with information about safety measures and the behavior deemed appropriate in the event of an accident. Furthermore, people must be fully consulted when new higher-risk facilities (as defined in the Seveso II Directive) are planned or when modifications are proposed to processes or emergency plans of existing ones.

In France, the “*Législation sur les installations classées*” authorizes the application of the Seveso II directives. The number of higher-risk facilities amounts to 400, out of a total of 1 250 covered facilities. Information about the latter is usually conveyed to the public via some information brochures distributed at the various city halls. In addition, some public administration units called DRIRE, or *Direction Régionale de l’Industrie pour la Recherche et l’Environnement*, are responsible for the prevention of major technological risks, the reduction of pollution and nuisances, and the control and elimination of process waste. A DRIRE is allowed to ask for third-party expertise to supplement a facility's hazard analysis.²⁷ More importantly, the DRIREs are also ascribed a role of catalyst in some associations, like the ones supervising air quality (39 associations) or industrial pollution (11 SPPPIs), and in the local commissions of information and surveillance (numbering more than 300).

The latter are becoming more numerous year after year, and they allow citizens to participate in the decision process. In Strasbourg, the local commission, which comprises 130 volunteers, has organized some educative and informative activities for children (Pupils manipulate and experiment with some chemical reactions; they also design some posters about what to do in case of emergency), patients in hospitals, and the general population (public meetings, quarterly information bulletins, and outdoor information panels). It also advises local industries on public risk communication (videos, pamphlets, brochures, etc).

The SPPPIs (*Secrétariat Permanent pour la Prévention des Pollutions Industrielles*), on the other hand, are created by the “Préfet,” the top regional authority, who usually chairs them, and have no legal status.²⁸ In Strasbourg, more than 350 people of various backgrounds – civil servants, environmental protection activists, industry employees, and scientists - participate in the local SPPPI. Besides technological risks, the SPPPI deals with water, air and noise pollution.

²⁷ Expertise is generally supplied by some insurance companies or the INERIS (*Institut National de l’Environnement Industriel et des Risques*) – a multi-disciplinary public-sector think tank.

²⁸ Since March 1982, the civil organization of France comprises three administrative layers at the local level: the communes, the departments and the regions. Each region is managed by a “*Préfet de Région*,” who is under the direct authority of the country's Prime Minister and implements central government policies regarding regional development and land-use planning. The SPPPIs of Strasbourg and Toulouse are the only ones not lead by a Préfet but by an academic.

After the AZF explosion in Toulouse, a large debate concerning better ways to implement and refine the Seveso II directive is currently occurring. Dozens of public workshops, involving owners and operators of hazardous facilities, elected officials, and citizens have been held throughout the country. Besides zoning and prevention within facilities, the issue of public information remains a recurrent one: all parties recognize that greater awareness on the part of citizens would render prevention and mitigation efforts more effective. In the footsteps, a recent law was adopted by the French senate on May 15th, 2003; article 2 of this bill precisely proposes the creation (supervised by the Préfets) of local committees of information and dialogue in charge of preventing and mitigating major technological and industrial risks – the so-called CLIC or “*comité local d'information et de concertation*” - around each any industrial basin including one or more installations subjected to SEVESO II.

Sitting on these committees will be some hygiene and security experts, industry representatives, local and national public officials, plant employees, and local residents. The CLICs will have a duty to organize and disclose information to the public; in particular, they will be entitled to use counter-expertise if necessary. At this time, there are still many unanswered questions about the budget and precise scope of the CLICs. However, the French government is already committed to actively support their implementation and "mise en route."

Appendix II: A model of voluntary environmental risk disclosure

This appendix sketches the model and conclusions of a recent article on voluntary environmental disclosures by Sinclair-Desgagné and Gozlan (2003).

Let some stakeholder (I) contemplate a project that has a probability π of being safe (g) and a probability $1-\pi$ of being dangerous (b) for human health or the environment. The stakeholder might endorse that project or not. If she does and the project turns out to be safe (dangerous), then she gets a positive payoff H (a negative payoff B). If she does not, then the project is dropped and she gets her status quo payoff, which is assumed to be 0. The project is proposed by a firm (F) that knows a priori whether it is safe or not. The firm's ex post payoff is strictly positive or is equal to 0, depending on whether the project gets endorsed or not; it might therefore seek to convince the stakeholder by disclosing more or less accurate information concerning the nature of the project. Let the endogenous precision (or quality) of the information provided be represented by a number $\beta \in [0,1]$: β is the likelihood that the stakeholder's evaluation of the project based on the delivered information will be positive given that the project is truly safe and negative given that the project is dangerous.²⁹ A number β strictly between 0.5 and 1 thus captures the situation where the entrepreneur provides faithful, albeit imprecise, information. In this case it follows from Bayes's rule that studying the firm's announcement makes the stakeholder believe the project is safe or dangerous with respective revised probabilities:

$$\text{Prob}(\text{safe, given positive}) = \pi\beta / [\pi\beta + (1-\pi)(1-\beta)] \text{ and}$$

$$\text{Prob}(\text{dangerous, given negative}) = (1-\pi)\beta / [(1-\pi)\beta + \pi(1-\beta)].$$

At this point the model yields a first conclusion: if information is costless and cannot be misleading, then the firm provides fully accurate information ($\beta = 1$) and so reveals the true nature of the project. This is just another statement of the well-known "disclosure principle" of persuasion games. This principle is supported by the following argument: the stakeholder would discount any imprecise information, because the firm

²⁹ In this game, the probability a positive evaluation results from a safe project is always equal to the probability an evaluation turns out negative when the project is dangerous. Hence, β corresponds to the likelihood of reaching the right conclusion upon further evaluation of the project, so $1-\beta$ is the probability of being mistaken, i.e. $\text{Prob}(\text{positive, given unsafe}) = \text{Prob}(\text{negative, given safe})$.

has no incentives to conceal data if the project is a safe one.³⁰ The policy implication is that the quality and content of voluntary disclosures are maximal when the public can veto a given project and information provision is free.

Disclosure related costs, however, which might come from the preparation and dissemination of reports or from the proprietary nature of information, raise a different picture. Partial information in this case cannot be exclusively associated with a dangerous project. One major consequence is that, if the stakeholder holds a positive expected payoff ($\pi H + (1-\pi)L > 0$) and is thus a priori favorable to the project, then the firm would not deem it useful to produce additional information. This calls for government intervention, which can take the form of mandatory disclosures (like the above EPCRA and RMP) or an advertisement campaign aimed at instilling doubts in the stakeholder's mind. The presence of a reluctant stakeholder with expected payoff $\pi H + (1-\pi)L \leq 0$ who can block the project, on the other hand, puts pressure on the firm to disclose information.

Let us examine the latter situation in the (most realistic) case where the firm cannot lie, its ex post revenue $R(\cdot)$ is highest if the project turns out to be a safe one (i.e. $R(g) > R(b)$), and the stakeholder can assess the accuracy level of disclosures. Denote $P(\beta)$ and $S(\beta)$ the firm's and the stakeholder's costs of respectively producing and studying information of precision β .³¹ Two situations are now possible, depending on the specific configuration of revenues and costs. In the first one, the firm with a safe project produces information of precision β such that $P(\beta)$ is just superior to $R(b)$, and the firm with a dangerous project remains silent. Upon public disclosure by the firm, the stakeholder thus infers immediately that the project is safe and endorses it.³² In the

³⁰ In the language of game theory, this is a "forward induction" argument. It supports the equilibrium precision level $\beta = 1$ by reasoning that the stakeholder's revised probability that the project is innocuous would be 0 if the firm switched to (out-of-equilibrium) partial disclosure and set $\beta < 1$ instead.

³¹ The two functions are strictly convex and increasing on the interval $[0.5, 1]$, with $P(0.5) = S(0.5) = 0$ and $P(1) > R(g)$.

³² This equilibrium is also based on forward induction arguments. The stakeholder believes that (out-of-equilibrium) additional information of precision β such that $P(\beta) < R(b)$ (resp. $P(\beta) > R(b)$) can only be supplied under a dangerous (resp. safe) project; her revised probability that the project is safe is then set to 0 (resp. 1) in this case and the project is not endorsed (resp. is endorsed).

second case, however, disclosures are the same whatever the safety of the project; their precision is just high enough to induce the stakeholder to undertake some costly evaluation before making a decision. The project is approved if and only if the evaluation concludes positively.³³ Government intervention might again be justified in this case, through subsidies to the study of disclosures or enforced standards of higher quality and accuracy.

³³ Denote β^* the accuracy of disclosures at this equilibrium. It is the unique β that maximizes (we assume of course that this maximand exists) the firm's expected payoff under stakeholder evaluation, i.e. that maximizes $\beta H - P(\beta)$ under the constraints that the stakeholder prefers to further evaluate the project rather than to either veto it [formally, $\pi\beta G + (1-\pi)(1-\beta)B - S(\beta) \geq 0$] or endorse it right away [$-(1-\pi)\beta B - \pi(1-\beta)G - S(\beta) \geq 0$]. The forward induction argument that supports this equilibrium runs as follows. Disclosures of precision $\beta \neq \beta^*$ such that $P(\beta) < R(b)$ (resp. $P(\beta) > R(b)$) can only occur under a dangerous (resp. safe) project; the stakeholder's revised probability that the project is safe is then set to 0 (resp. 1) in this case and the project is not endorsed (resp. is endorsed).