

Risk Communication at the Community Level: European Lessons from the Seveso Directive

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After the devastating accident at Seveso, Italy on July 10, 1976 and the resulting confusion between the local authorities and the company's representatives, the European Community issued a General Directive in 1982 that requires every chemical company to provide full information on hazardous sites, emergency plans, storage of dangerous substances, accidental release scenarios, and similar issues to the host community. In addition, the public has to be informed about the potential risks of the facilities and the protective actions necessary to undertake in an emergency. The Directive resulted in an increased effort to communicate the risks of hazardous facilities to community officials and to local residents. This article explores the strategies of and the experiences with the risk communication efforts in different European countries and describes the responses to these efforts by stakeholder groups and the general public. The political adoption of risk communication programs are strongly influenced by the regulatory style of each country. Adversarial and consensual systems appear to cope better with public disclosure of information than bureaucratic, corporatist, or authoritarian systems. Because of differences in regulatory style, only few elements of the European experiences with risk communication can be transferred to the U.S.-context.

There were more than 6,900 accidental releases of acutely toxic substances in the United States between 1980 and 1985 (Baram 1987, p. 82). As a result, 138 people lost their lives and 4,717 were injured. More than 200,000 people had to be evacuated temporarily. The overall damage has been estimated to exceed \$2.1 billion.

Such accidental release of toxic substances are clearly a serious threat to human health and economic values. But can these risks be managed to ensure that the probability of an accidental release is reduced to a level that society would be willing to tolerate, that the magnitude of potential damage is kept to a manageable proportion, and that post-accident consequences are mitigated through appropriate health care and emergency control measures? The problems of how to determine an acceptable level of risk, of how to define a social system to cope with catastrophic events, and how to evaluate the appropriateness of the envisioned mitigation measures cannot be resolved by scientific reasoning or legal rules alone. They require value judgments and deliberate decisions about tradeoffs. An informed citizenry should make these choices through elections and other public deci-

sion processes (Baram 1987, p. 18). The involvement of affected citizens implies, however, a continuous communication process between the operators of hazardous facilities, local and regional authorities, and the public.

Beyond the political purpose of legitimizing residual and acceptable risk, risk communication at the community level serves three purposes:

- the moral purpose of giving affected persons knowledge about the risks to which they are (usually involuntarily) exposed (Baram 1987, pp. 17 and 18);
- the efficacy purpose of using communication to implement protective actions that minimize the negative outcomes (Covello et al. 1986);
- the psychological purpose of creating trust and confidence in emergency management and risk handling agencies (Keeney and von Winterfeldt 1986).

In spite of its vital functions, the legal requirements for risk communication in the United States were fragmented

prior to 1986. Over twenty states and hundreds of municipalities had enacted laws and regulations for emergency response planning and risk communication, but there was no federal legislation to initiate and enforce risk communication on the community level (Baram 1987). Under Title III, Superfund Amendments and Reauthorization Act of 1986 (SARA) Public Law 99-499, communities were granted the right-to-know about hazardous facilities, risk management efforts, and emergency planning. Title III includes the following requirements for risk communication:

- joint emergency planning (local emergency planning districts with committees consisting of different stakeholder groups);
- inventory of local data on location and quantities of hazardous materials, their handling, toxicity, dispersion parameters, etc.;
- community right-to-know reporting requirement (routine releases);
- notification about accidental releases, emergency plans, and protective actions.

Title III includes a right-to-know requirement. This means that the audience of the communication is entitled to receive any information that they deem important. In contrast, the term "need-to-know" is used for a requirement that information necessary to assist those positively in danger is disseminated. The selection of information in this case is done by the communicator (O'Riordan 1989).

Only two years have passed since the Title III was enacted, so experiences with the implementation and success of this new legislation are limited. However, the European Commu-

nity (EC) passed similar legislation in 1982. The so-called Seveso Directive may provide valuable lessons for the United States.

The Seveso Directive

The Seveso Directive was a response to two major chemical accidents in the European Community. A June 1974 explosion in a chemical factory at Flixborough (United Kingdom) killed 28 workers and injured 36 (Otway 1988). More than 50 casualties among nearby residents and hundreds of injuries were reported. An investigation into the cause of the accident revealed that the company had stored 43 times the amount of flammable fluids licensed by local authorities. The major chemical involved in the accident (cyclohexane) was not on the licensed list at all. Residents near the plant were absolutely ignorant of the potential danger and of any emergency plan or protective actions.

The second incident became a symbol for chemical disaster. It occurred on 10 July 1976, at ICMESA, a chemical plant for the manufacture of trichlorophenol, in Seveso, Italy. In an explosive reaction, highly toxic 2,3,7,8-tetrachlorodibenzo-p-dioxin was formed and released into the air (Naschi 1987, p. 49). Although none of the workers nor residents were killed, 220,000 people had to be placed under medical surveillance (Otway 1988). The accident caused 187 cases of chloracne, particularly among children. The major disaster was the lack of communication and the total confusion after the accident. A general evacuation was not undertaken until 17 days after the accident. For 13 days, the authorities assured the population that they had no reason to be concerned. On the 13th day after the accident, the Regional Health Director claimed on TV that everything was under control. On the same day, the medical director of the industrial group (Hoffmann La-Roche) declared the situation to be very serious and that drastic measures, such as removing the top layer of the earth and destroying houses, were required (Lagadec 1987, p. 5).

These accidents led the EC to initiate three Directives to cope with future chemical accidents. Risk communication was mentioned in only one of the them: The Seveso Directive (Directive 67/548). It included a paragraph that granted communities the right to be informed about the hazardous material stored at any nearby plant, the potential risks associated with them, and the on-site contingency and emergency plans for dealing with accidents. The major provisions of the Seveso Directive with respect to risk communication are listed in Table I.

The focus of the Seveso Directive is on risk management and emergency planning. Risk communication is only considered as an input to better management, not as a political or moral obligation to share all vital information with the affected population. The risk communication literature refers to such a narrow understanding of risk communication for communities as the "need-to-know" versus the more comprehensive notion of "right-to-know." The "need to know" approach focusing on aspects of emergency planning and protective behavior is clearly emphasized in the original version of Article 8 of the Seveso Directive:

1. Member States shall ensure that persons liable to be affected by a major accident . . . are informed in an appropriate manner of the safety measures and of the correct behaviour to adopt in the event of an accident.
2. The Member States concerned shall at the same time make available to the other Member States concerned . . . the same information as that which is disseminated to their own nationals.

The major goal of Article 8 is to ensure that vital information for managing chemical disasters will be made available to the off-site emergency management agencies and that each member country can learn from the experiences of the

Table I. Summary of Seveso Directive for relevant risk communication (Source: Otway 1988).

Articles	Description
Article 5:	Manufacturers must notify the competent authorities of dangerous substances (quantities, properties, location, exposed workers, processes used, hazard sources, safety provisions, on-site emergency plans, and information for off-site emergency plans).
Article 7:	Manufacturers must be informed about state authority measures for off-site emergency planning.
Article 8:	Affected population must be informed of the safety measures and protective actions to take in an accident. Information has to be made available to all member states.
Article 10:	The manufacturers must report to the competent authority any accident that occurs; how to alleviate effects and prevent reoccurrence; contingency plans; and post-accident management.
Article 11:	The manufacturers and the local authorities have the duty to inform the commission about all incidents and lessons learned during an emergency.
Article 12:	The EC Commission will keep a European register of all incidents and management interventions.
Article 13:	Publication of data should be limited to avoid competitive disadvantages (confidentiality clause); no information will be given to third parties.
Article 18:	National authorities agree to exchange information on the experience of accident prevention and consequence limitations.
Article 20:	All subsequent national regulation has to be reported to the EC Commission.

other member countries.

A routine revision of the Directive was prepared in 1985 and passed in 1987. A substantial revision of the Directive was undertaken by the Commission in response to a major chemical spill into the Rhine River on November 1, 1986. Local authorities were not fully aware of the dangerous substances stored at the facility in Basel and the public was outraged about the lack of prior information about the potential risks to which they were exposed. This led the EC Commission to amend the Seveso Directive to include storage of hazardous substances, not just production of these substances. The Commission also adopted a new philosophy reflecting a shift from a passive "need-to-know" to an active "information transfer" concept. Article 8 still does not include the right of the public to be fully informed about the risks of the industrial activities or to take part in the regulation or control of the hazardous substances. But it demands that information be communicated to the concerned parties on an active basis through public information media such as leaflets or information boards. According to the new revision, information has to be given to the public not only on request, but should be disseminated as widely as possible. Placing the information in city halls or in libraries is not regarded as sufficient for meeting the revised standards of Article 8. The kind of information to be distributed to the public is specified in Annex VII as shown in Table II.

Even after these revisions, the major thrust is still on communicating about emergency situations and behavioral responses recommended for such an event. But the requirement to identify the hazardous substances and explain their effects on human health is a first step to a substantial "right-to-know" policy of giving citizens the background information to make personal choices (such as moving away) or political choices (such as voting or being active in community affairs). Whether such a "right-to-know" overtaxes the ability of a citizen to make the appropriate choice cannot be addressed in this article.

As of June 1988, the amendment had not been passed by the EC council, the major legislative body of the Community. Many industrial spokespersons are opposed to the amendment. They are concerned that the information would scare people more than help them to respond rationally in an emergency (Otway 1988; Wynne 1988).

Implementation of the Directive in the Member States

All EC member states are obliged to initiate national laws and regulations to implement the Seveso Directive. Although EC Directives are binding for each member state, the national parliaments or executive branches have enough discretionary power to translate a directive into national regulation in accordance with their own cultural, political, regulatory, and social requirements (with the exception of the Netherlands, where EC Directives are automatically adopted into the national body of laws). This process prolongs the implementation and frequently dilutes the original intentions of any Directive (Wynne 1988). Given this complex procedure, it is remarkable that all member states—with the exception of Italy—have passed national regulation in accordance with the Seveso Directive (Wynne 1988).

But with respect to risk communication and the application of Article 8, the national adoptions reflect a cautious or even hostile approach. In West Germany and the Netherlands, existing legislation provides public access to information in the licensing procedure. Public officials felt displaying emergency plans in public buildings was sufficient to meet the requirements of Article 8. In France, public authorities were confident that they already had provided their communities with all the necessary information and concentrated therefore on the other requirements of the Seveso Directive. At the end of 1987, Ireland promised to

abide by the Seveso Directive in all points, but so far has no communication plans. In contrast, the United Kingdom has launched a major risk communication program. Information that even exceeded the limited purpose of providing guidelines for emergencies was conveyed to the communities via brochures, leaflets, and public speeches.

It is difficult for a U.S. audience to understand the more than hesitant adoption of Article 8 in the EC member states. The familiarity with natural disasters and their management (on average, one evacuation takes place in the United States every day), the political culture of free information exchange (Freedom of Information Act), and the role of civil service as an information broker (and not as a benevolent guardian of the common good) has led to a public attitude that almost takes it for granted that information about emergencies is readily available and submitted to public scrutiny (Baumann and Renn 1988). Although the "right-to-know" is highly debated in the United States, the "need-to-know" is almost unanimously approved of by all affected parties there.

The European situation is different: With a lack of natural disasters and a stronger paternalistic role of the civil service, most residents near hazardous facilities have neither experienced nor anticipated any major emergency. Trust and confidence in the civil service has eroded over time, but most people still believe that the regional authorities will take good care of them should something go wrong at a facility. None of the EC countries has an equivalent of the Freedom of Information Act (Baram 1987). Conflicts are resolved in most European countries through informed consent of social elites. Members of the elite circles do not perceive a necessity to disclose the informal communication processes. Giving sensitive information to the public is unprecedented and against the established traditions in most European political cultures.

Therefore information transfer is restricted to the legal requirements during licensing. Some nations, such as the Netherlands, provide extensive information during the licensing procedure and encourage public participation. Others such as France have developed a system of incentives and community benefits for the local population around hazardous facilities, but do not share information with the public beyond the typical public relations approach. An active information sharing with the affected population and an active involvement of the public in emergency planning are both major innovations in the relationships between plant operators, public authorities, and affected citizens.

Beyond the novelty of risk communication for most member states, there were other important reasons for the delay or even rejection of Article 8, even in its milder original form. First, a "need-to-know" presumes the existence of contingency and emergency plans that are to be communicated to the public. But in many countries such plans did not exist, were only rudimentary, or under development. Therefore, the first priority was to analyze the hazards present at a plant, to identify major potential accident scenarios, to develop on-site emergency plans and then off-site plans, and to articulate potentially effective protective actions (Wynne 1988). An example for this situation is France, where the risk communication program is scheduled to be launched in 1989 (Wynne 1988).

Second, nations such as West Germany, the Netherlands, Luxembourg, and Denmark, already have established public information and involvement programs in their licensing procedures. The opportunity for citizens to intervene in the planning process and to demand access to the documents resulted in delays and conflicts between regulating agencies and citizens' groups (Renn 1985). Tired of dealing with public opposition and concerned about delays for new industrial projects, most regulatory agencies rejected any extension of the existing information sharing.

Third, the duty to inform the public was clearly defined in

the Directive as an obligation of local authorities, and not industry. The flow of information was visualized as a two-stage process: Industry should provide the authorities with all the necessary information, enabling them to design effective emergency plans. At this stage, confidentiality is assured and industry is not allowed to withhold information for proprietary reasons. The official authorities then convey parts of the received information to the public, focusing on the emergency provisions and protective actions. By law, they are obliged to keep all proprietary information secret. This information model assures a good working relationship between industry and the authorities and may indeed assist in constructing the most effective emergency response, but it easily may convey an image of conspiracy between industry and regulators in public perceptions. This image often becomes a self-fulfilling prophecy, forging a tie between the plant operator and the emergency managers who both feel pressed to defend themselves against public claims.

Fourth, problems of clarification prevented a smooth and

timely implementation of the Directive. It lacked definitions of what constituted a major accident, how large the zone of emergency planning and risk communication should be, how to deal with expert dissent about hazardous materials and their effects, and in which form information had to be provided (Wynne 1988). Giving much discretion to each member state was intended to make adoption easier, but resulted in lengthy debates in each country, and often at each site, about the conditions and framework for implementing risk communication programs.

In essence, most European countries did not establish a risk communication program that went beyond what had been done under various earlier national provisions. Wynne therefore concludes: "The great majority of industrial accident hazard sites in the EC—an estimated 1500 or so—do not benefit from the public information processes required under Article 8" (Wynne 1988). The exception is the United Kingdom where industry and public authorities cooperated in launching information programs at many industrial sites.

Empirical Studies about the Effectiveness of Risk Communication

Survey data about the effectiveness of the risk communication programs developed in accordance with Article 8 of the Directive are only available in the United Kingdom and the Netherlands. In the United Kingdom, the original responses to Article 8 were not much different than in other European nations. Industry spokespeople warned public authorities not to disclose too much information since it would generate unnecessary fears and worries among the population. But in intensive negotiations between industry and the authorities, a joint information campaign was agreed on and almost immediately implemented. In contrast to France, for example, information was provided even at those sites where emergency plans were incomplete or outdated. The information covered all the items that were part of the existing plans or results of risk assessments and extended the communication program to cover the activities planned or underway to change the situation.

Communication programs were launched at more than 70 percent of all designed sites. The results so far disprove all the fears or claims of public overreaction or increased opposition. The communities reacted to the information either with favor or with apathy, but hardly ever with hostility or outrage (Wynne 1988).

Manchester was one of the first sites to have a risk information program. A survey revealed that 40 percent of those questioned were concerned about the hazard, but did not indicate any major disapproval of the risk management performance by the local authorities. The residents did not regard the risks to which they were exposed as a serious threat although many had difficulties in expressing the degree of danger posed to them by the facility. Asked to indicate the importance of the threat, they ranked it as less important than unemployment, for example. The issue was not central for them. Most of them had not studied the emergency guidelines and were basically unaware of the protective actions they were supposed to take in the case of an accident (Wynne 1988).

The lessons from the experiences in the United Kingdom are that information about hazardous facilities and emergency planning is likely to elicit calm responses and may even result in underreactions and downplaying of the potential danger. Many respondents felt that it was not worthwhile to study protective actions for emergencies. Furthermore, trust and credibility of the information source were enhanced more than compromised even at those sites where existing plans were deficient and in an urgent need of improvement. The notification that the present situation would be improved and that the necessary changes were underway helped to convey that authorities were eager to

improve public protection and that they did not try to keep the existing deficiencies secret.

It should be remembered that the information given covered only the risk-related data about the hazard and its health effects and emergency responses. In some areas, public officials cooperated with industry to disclose more information and to give a detailed analysis of the production and safety features of the plant. A formal involvement of citizens in emergency planning and community control of safety requirements, however, was neither envisioned nor implemented.

The traditional European way of displaying information in public places was the topic of a Dutch study about the effects of the Seveso Directive (van Eijndhoven and Worrel 1987). Although information about hazard prevention, accidental management, and mitigation of accident consequences was available in principle, interested citizens had to know where to find this information and how to decipher its technical language. Surprisingly, however, most surveyed citizens trusted the watchdog role of the civil service and showed no overt interest in gaining more information. But they were more than eager to blame public authorities for any malfunction when they had experienced an accidental release of hazardous material.

The study also showed that passive access to information was insufficient to guarantee public education. Most respondents were unaware of the opportunities to find information and were badly informed about protective actions in the case of an emergency. The passive disclosure of information was almost exclusively used by activist groups as a means to find evidence for their claims of insufficient safety requirements and did not reach the targeted audience of citizens. This experience and similar reports from other European countries may have been the reason for the EC Commission to propose a change in Article 8 as to require an active communication approach.

Responses by Stakeholder Groups

The apparent lack of public interest has been one of the most pervasive arguments by industrial groups in Europe to prevent or modify the implementation of Article 8. According to their view, the public wants to trust the emergency managers and does not want to be bothered by frightening disclosures. Therefore, communication between authorities and industry would be vital for reinforcing the confidence in the management capacity of the authorities. They argued that communication to the public would be detrimental because it would create distrust in industry's performance, construct an artificial gap between industry and regulators, and poison their cooperation. In addition, industry envisioned the following problems as a result of public information (Baram 1987, pp. 22-23; Wynne 1988):

- disclosure of valuable proprietary or trade secrets which could have a negative impact on competitive position;
- infringement on the autonomy of corporate managers and their obligation to protect firm assets and shareholder interests;
- imposition of new costs and burdens;
- intervention by agencies in the process of planning for and managing an emergency, resulting in a diffusion of responsibility for safety and therefore a diffusion of accountability;
- detrimental effect on public image of corporations.

Environmental groups, on the other hand, viewed the information conveyed as merely an attempt to manage emergencies more efficiently and diffuse responsibility from the originator or regulator of the hazard to the victims. Giving protective action guidelines was considered a way to familiarize the public with the notion of major catastrophes and

blame the victims for not taking the prescribed protective actions in the case of an emergency. Although most environmental groups agreed that emergency plans should be made public, they viewed this "need-to-know" disclosure only as a first step to make the public more aware of the risks so they would demand stricter regulation.

Environmental groups, consumer groups, and labor groups have filled the vacuum where official communication was not available or deliberately withheld (Wynne 1988). Given the controversy and confusion about the major incidents that have shocked the European population in the last decade (from Seveso to Bhopal, from Chernobyl to the Rhine disaster), I would hypothesize that in the long run the system of "blind" trust in the civil service is unlikely to survive. Although public opinion data still show considerable trust in official emergency management authorities (cf. above mentioned studies; for Chernobyl, see Renn 1988), a clear trend toward more openness and public participation appears in almost all European countries. Such a trend is almost impossible to reverse.

Risk Communication and Regulatory Style

Risk communication is part of a regulatory system that reflects established national traditions, the functioning of political and social institutions, the structure of political decision making, procedures of legitimate influences on the decision making process, and customary practices (O'Riordan and Wynne 1987). The characteristics of such a system are usually referred to as regulatory style. Regulatory styles can be grouped into five different clusters (O'Riordan 1985; O'Riordan and Wynne 1987; Baumann and Renn 1988):

- The *(neo)-corporatist approach* is characterized by a collegiate form of decision making whereby established social groups negotiate regulatory actions with the official authorities and define the range of responses that are labeled acceptable for conflict resolution (O'Riordan and Wynne 1987, p. 403). Scientific evidence is not a crucial element of finding compromises because confidence in the scientific honesty and personal reputation of the scientists represented in the decision making board is perceived as a substitute for "understanding" the scientific issues. This approach is manifested in West Germany and in some of the Scandinavian countries.
- The *authoritative approach* relies on strong executive power for setting standards and enforcing compliance, involves conflicts among different governmental agencies rather than between government and social groups, and assigns clear responsibilities to governmental actors (O'Riordan and Wynne 1987, p. 402). Scientific evidence and risk assessments are important planning tools for the decision making elite, but are less relevant for the political justification of regulations. The authoritative approach is manifested in France.
- The *bureaucratic approach* is characterized by a collective form of decision making, overlapping responsibilities, dominance of complex procedural rules, and inter-organizational conflicts. In contrast to the authoritative approach, the structure of command is less defined, and different hierarchical systems compete with each other (Bauman and Renn 1988). Scientific evidence plays a minor role, but many bureaucratic institutions try to incorporate scientific advice as a means to enhance their power and to control the production of knowledge. This approach may be typical for Italy.
- The *consensual approach* is based on a high level of trust between institutional actors, negotiations behind closed doors, discretionary power of regulating agencies, and reliance on judgment rather than evidence (O'Riordan

Table III. Regulatory styles and their impact on risk communication.

	Corporatist Example: West Germany	Authoritative Example: France	Bureaucratic Example: Italy	Consensual Example: United Kingdom	Adversarial Example: USA
Level of main responsibility	Major interest groups	Federal government	Competing bureaucracies	Commissions, agencies	Agencies, courts
Role of formal analysis					
a) Justification	Medium	Low	Low	Medium	High
b) Litigation	Medium	Low	Medium	Low	High
Freedom of information	No, but leakages	No	No, but leakages	Low	Yes
Role of civil service	Legalistic	Paternalistic	Gatekeeper	Guard of common good	Broker
Function of communication	Efficacy (trust)	Efficiency (trust)	Power, trust	Trust, efficacy	Regulation (Trust)

dan and Wynne 1987, p. 400; Bauman and Renn 1988). Similar to the corporatist approach, the consensual style relies on argumentation in a closed group situation rather than on abstract evidence or risk assessments. A typical example may be the United Kingdom.

- The *adversarial approach* is characterized by large executive agencies, by precise procedural standards and detailed rules, by high levels of openness to documentation and public scrutiny, and the need for scientific justification of resulting decisions. Scientific evidence and risk analysis play a major role in justifying and reconciling conflicting claims. This approach is typical for the United States (O'Riordan and Wynne 1987, pp. 398-400).

Table III illustrates how different regulatory styles affect the adoption and acceptance of risk communication. Risk communication serves different functions within each regulatory style. In the corporatist structure, information is used to inform the public about the decisions that have been negotiated and to optimize behavioral responses in emergency situations. A minor goal is to enhance trust and credibility. Public involvement is used only to provide valuable feedback or suggestions so the involved parties can bargain for more influence and use public support as a vehicle to exercise pressure. Thus it is understandable that the corporatist countries felt no additional need for public information: the existing systems assured the basic communication needs for efficacy and to a lesser degree, trust (i.e., minimal need-to-know).

Under the corporatist approach, information about hazard prevention, accidental management, and mitigation of accident consequences is available in principle. Interested citizens, however, have to know where to find this information and how to decipher its technical language. If trust is lost in the corporatist style, the regulatory process is often paralyzed since no functional equivalent exists to compensate the lack of confidence in the key actors.

Trust plays a smaller role in an authoritative system. The paternalistic role of the civil service means information is provided to make emergency management efficient and smooth, but further efforts to communicate are not necessary unless public pressure becomes too strong. Authoritative systems are usually fast in responding to information

needs, but are very selective in what they provide to the public. The delay of risk communication in France was not caused by the unwillingness to give information, but because appropriate information had not been generated and selected for publication. On their own initiative, many mayors in communities with hazardous facilities in France distributed booklets or brochures on emergency management. The emphasis was on the message that the public authorities were in control of the hazards and well prepared for an emergency (Wynne 1988). As with the corporatist style, the need-to-know is accepted in an authoritative system, but the authorities determine what the public ought to know.

The bureaucratic system involves a muddling-through approach and takes the longest to implement a communication program. It is typical for this system that key actors serve some of the bureaucratic functions on their own account without formal legitimization or official approval (which often leads to litigation). Communication is focused on creating favorable images about the bureaucracies or actors involved. This contrasts sharply with the Directive's intention to provide sensitive information about the hazardous situation and make the population knowledgeable about the appropriate protective actions. Due to the diffusion of responsibility, bureaucratic systems are often disinterested in the efficiency of their decisions. Clearly, implementing the Seveso Directive in such a regulatory system would create the most severe resistance, basically in the form of delaying the process as long as possible. This is exactly what has happened in Italy. Therefore, bureaucratic systems feel challenged by more open information to the public and often oppose even a minimal need-to-know.

The consensual approach relies on the acceptance of informed judgment as a major yardstick for decision making. Acceptance depends on trust and credibility of the information sources. Evidence and counter-evidence, litigation, and formal procedures are less important for the implementation of regulatory actions. Rather, good judgment, relying on highly reputable experts (such as Royal Commissions), and showing good will are major elements for regulatory successes and public acceptance. Since trust and competence are essential goals of communication in a consensual system, the information provisions of the Seveso Directive were not in opposition to these goals. After an initial hesitation, indus-

try and public service in the United Kingdom were convinced that they could "sell" the products of the existing regulation and document their good judgment or at least good will (Wynne 1988). The responses by the public reinforced the notion of creating trust and confidence through the means of risk communication. Thus the Directive did not contain any destabilizing elements and included many constructive challenges that helped to consolidate the underlying rationale of the consensual system. The consensual style provides the best conditions for an active need-to-know that is aimed at disclosing all relevant information to the public as a strategy to convey trust and confidence in the decision-making elites.

All European approaches have in common the fact that risk communication is not regarded as a supplement or a substitute for risk regulation (Baram 1987). The notion of a "right-to-know" as a prerequisite for citizens' participation in decision making and co-determination of the outcome of this involvement is alien to the European styles of regulation. Rather, the focus is on improving risk management and creating trust. Public involvement has entered the licensing of new facilities, but public participation is not envisioned for operation control, monitoring, and hazard management. The United States, on the other side, has developed a system of public involvement that mandates input from different public groups in the decision making process. If this input is ignored or not adequately addressed, litigation is likely to be the consequence. Thus, within the adversarial system, the concept of "need-to-know" is too limited. Trust, credibility, and legal acceptability are all linked to the overall rationale of involving and functionally integrating different viewpoints in the decision process.

More recently, adversarial elements and initiatives have been introduced to European legislation including the request for more active participation of the affected public. Examples for such a mandate are the new Environmental Assessment Directive which has recently been enacted and the 1988 OCED recommendation dealing with accidents involving hazardous substances. In addition, environmental and citizen's action groups in most countries have urged their governments to open the negotiations about environmental standards to public interest groups and to publicize their results.

It is premature to postulate a convergence of national regulatory styles toward an adversarial mega-concept. The pending legislation, even if it appears to fit the adversarial description, has yet to be adopted by each member state. Nevertheless the evolution of legislation that is intended to grant citizens more rights to become involved in emergency planning and hazard management, and the slowly growing erosion of public trust in traditional institutions of risk management amplified by the recent disasters in Chernobyl and Basel are signals for a change toward a more adversarial style in European risk regulation. It will be interesting to observe how these adversarial elements will coexist with the traditional forms and what kind of regulatory innovations will emerge in order to reconcile the often contradictory elements of the different systems.

Conclusions and Recommendations

The major goal of the Seveso Directive is to improve risk management and emergency planning. In spite of substantial improvements in risk management (Baram 1987, pp. 80-81), the specific requirements for risk communication have been implemented only halfheartedly. The Directive included the obligation to inform the affected population about the hazardous material and its properties, accident prevention measures, and emergency planning. Even though the Directive only postulates a "need-to-know" rather than a "right-to-know," except for the United Kingdom, all member states either were reluctant to adopt this requirement or felt that

the existing laws already covered the intent of the Directive.

All European approaches are characterized by a clear distinction between risk regulation and risk communication. The dialogue between industry and regulators serves as the major information processing station for designing risk regulation. The dialogue with the public is meant to convey these regulations to the affected population, basically for two reasons: establishing confidence in the risk management capacity of the authorities and making the public aware of protective actions for emergencies. The U. S. approach, in contrast, is geared toward using communication between and among all three actors (industry, regulators, and the affected public) as a major mechanism to generate regulation or even substitute for formal regulatory provisions. The legal system of the United States, in particular the tort cases involving substantial payoffs for potential victims, suggests the incorporation of risk management functions into risk communication. Prior consent with local residents about the tolerability of the risks decreases the probability of costly tort cases should an accident occur or should routine emissions be linked with specific health effects. Michael Baram concludes in his analysis:

The E.C. fails to empower the public but guarantees company safety analyses and expert-driven plans for emergency response by firms and officials. The U.S. system empowers the public, fails to assure that facility safety will be addressed in any manner other than by fortuitous conflicts, and provides for local plans with public involvement.*

Variations in national regulatory style seem to be the best explanation for the different treatments of the communication requirement. The consensual approach exercised by the United Kingdom appears well suited for the "need-to-know" requirement because it assists in conveying trust and confidence in the regulatory bodies. The authoritative approach, most typical for France, is also in accordance with the "need-to-know" philosophy. Communication relies here, however, on the availability of complete and reliable emergency plans that had to be developed before they could be communicated to the public. The corporatist approach, most typical for West Germany, is based on giving partial information to the public as a means to increase efficacy and to create trust for the informed consent by the decision-making stakeholder groups. An extension and intensification of such a communication program, however, was regarded as a threat to the civil service because it might destroy the cooperation between regulators and industry and challenge the painfully derived compromises between the major, often conflicting parties involved in the negotiations. The least adaptive system is the bureaucratic approach, typical for Italy, in which information always challenges the legitimization of existing agencies and authorities. For this reason; it is not surprising that risk communication attempts were widely blocked there.

Given the dependence of risk communication on the prevailing regulatory style, is there anything to learn from the European experience for the United States? In spite of the problem of transferability of regulatory elements from one context to the other, some insights can be gained from the study of the European countries:

- Both industry and regulator have gained from cooperation. Regulators gain better knowledge of the plant and sometimes use industry's resources for off-site emergency management while industry can profit from the relationship in terms of gaining trust. Although confidentiality of contacts and information are legally restricted in the United States and are counterproductive for gaining public trust, regular consultation and cooperation are vital elements to improve the emergency management capability of communities.

* Baram 1987, p. 109.

- Citizens in all EC countries are more aware of the hazards in their neighborhood and demand more information and involvement. The degree of this demand varies from country to country, but there seems to be an international desire for more and accurate information. Early involvement of citizens and incorporation of their concerns into risk management can help avoid costly litigation. This experience is even more relevant for the United States with its long tradition for public involvement and the enormous cost of litigation.
- The few empirical studies on the effects of information demonstrate that the popular notion of an overreacting public that demands zero risk and absolute safety is a myth. On the contrary, public responses were rather moderate and calm. In some instances, even the list with protective actions was ignored. Getting the attention of the public for these questions seems to be the far more serious problem than avoiding unnecessary fear and outrage.
- Transnational cooperation and sharing of information are key elements of the European approach to risk management. Learning from the mistakes of others, coordinating joint management efforts, and keeping a European register for all incidents provide the basic elements for an evolution of knowledge that helps to improve emergency management and to cope with the catastrophic potential of many facilities. In this respect, the United States is far behind the European nations. The belief in decentralization and organizational fragmentation (evident in the parallel emergency planning of police, medical services, emergency management agencies, and recently chemical disaster management in accordance with Title III) impedes the information flow between hazard management agencies and prevents a more coherent and coordinated system of emergency planning. Centralization may not be the right answer, but integration of different services and construction of a commonly accessible body of knowledge are needed improvements for the U. S. system. Title III has the potential to provide such a network for transferring information on routine releases.

The Seveso directive was a first and courageous step for most European nations to meet the political and moral mandate for public information. Not all member states are yet ready for full implementation of the Directive, but the movement toward a more open and adversarial style seems irresistible. Having pushed public involvement much further than the European nations, the United States is now in the phase of enhancing this element of communication and granting citizens a "right-to-know." The major lesson one can learn so far from the European experiment is that the public is more mature and rational in using those rights than many skeptics have predicted. The outlook for the United States justifies cautious optimism for implementing the "right-to-know" clause of Title III as a major guideline for risk communication on the community level.

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