

# Environmental Emergencies: Preparing for Critical Hours

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An otherwise useful chemical may become a villain in an instant simply because it is released to an unprepared environment. The air quality significance of such an event can be profound when air-active chemicals are involved. We can exert little control over the effects of such chemicals on man or environment for some length of time; therefore, what is done or not done by all persons involved during the first 4-6 h is critical. Consequently, how governments, industries, and local communities prepare for the event eventually dictates the outcome in terms of damage and even death.

The field of environmental emergencies brings into focus a wide spectrum of interests and concerns. The potential exists for water, soil, and air contamination and, of course, public welfare and long-term public health need to be considered. Specific special interests also are involved: the three levels of government (federal, state, and local), the chemical industry, the transportation industry, the persons and property immediately affected, and others whose interests are not so direct.

An event involving the transportation of certain chemicals may bring all of the above concerns and interests into play. This interaction makes the field an interesting (if difficult) one. At any one event as many as 200 officials, representing various local, state, and federal agencies may be in attendance. This group will usually include multiple representatives from individual agencies. In addition, a number of industry representatives are likely to be present. Obviously, many jurisdictions and applicable statutes are involved, and at times these will conflict or overlap. Most of the officials and other involved persons arrive on the scene sometime between 4-6 h following the event.

For many reasons, the time frame of 0-6 h after the start of the event is critical. This period is referred to generally as the first responder phase of a chemical release and is typified by the following most obvious immediate effects:

1. Escaping liquids,
2. Mixed and uninhibited releases of gases,
3. Fires and explosions,
4. Persons injured or killed, and
5. Curious onlookers.

The first responder arrives, initial evacuation is performed, and decisions are made as to recovery of injured and containment of liquids and gases and fire control. Local leadership and control of initial activities is developed and communications are established. Early-arrival secondary responders include (a) industry officials, (b) state and federal officials, and (c) the press. State officials and industry officials should arrive 3-4 h after the event. Federal officials historically take 4-6 h and, in some cases, up to 10 h.

Early actions and decisions made at the scene have broad implications for later activities. Whether the consideration is technical, sociopolitical, or logistic, the impact on later decisions is considerable. Consequently, on-scene coordination of effort must begin as early in the event as possible. Many experienced and sincerely dedicated persons subscribe to the idea that one person should be in charge of the entire operation. Conceptually, this would be ideal but, as a practical matter, it will probably never happen. There are simply too many jurisdictions involved that have a legally constituted basis. For example, there are three sets of laws (federal, state, and local) that immediately

apply as well as the constitutionally protected property rights involved. Also, no entity or person is clearly capable, either technically or in terms of existing authority, to legally maintain absolute control over every operation during the entire term of the event.

There is, however, a concept that approximates the "one person in charge idea" and is workable. This is an on-scene operation that establishes on-scene coordinators (OSCs) for all three levels of government backed by a team of individuals. This concept has its roots in the National Contingency Plan for Hazardous and Oil Spills that was first developed in response to edicts laid out by the Congress in the Clean Water Act of 1972 (Public Law 92-500). Today this same national plan has been completely rewritten as a result of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Public Law 96-510), or as it is frequently referred to, Superfund.

Executive Order 12316, signed by President Reagan on August 14, 1981, assigns to several federal agencies specific areas of emergency response responsibility. So, although institutional arrangements are such that no one person is in charge, one person may very well be responsible to the Congress for at least the federal behavior at the accident scene. The OSC is the federal creation that has this responsibility. The OSC is backed by a regional response team (RRT) made up of representatives of federal, state, and local agencies. The RRT is the advisory body to the OSC.

The problem with this system is that sheer numbers of people can make it awkward. However, if involved groups of agencies can designate representatives to be OSCs, the group becomes the RRT shown by Figure 1. This size team is not only manageable but is also extremely functional.

Finally, a realistic view must be taken by all concerned of the various interest levels as the accident coordination proceeds. For example, note in Figure 2 how the leadership or coordination function may shift from government to government as time progresses. (The shaded areas in the figure indicate time zones that are vulnerable to conflicts of jurisdiction and interests. The curves suggest how peaks of interest can develop among various governments because of such things as existing laws, bounded jurisdictions, and time-of-response logistics.)

The above remarks are directed at current methods of government's response to chemical releases. Preparation for the response is equally confounding. Contingency planning, of course, is a large portion of the solution to this problem, but at the local level even contingency planning falls short of the ultimate goal of total preparation. For example, the National Contingency Plan (40 CFR Part 1510) is a summation of parts that, in fact, do not all exist. An underlying assumption of the national plan is that state and local governments maintain an equivalent state of readiness for the chemical event. This is only partly true. In fact, a 1978 detailed study of state emergency response readiness by the Arthur D. Little Company indicated that, although state governments are interested and willing, funds and resources to respond on a full-time basis were reported as adequate by only a few of the states. At the local level prior planning is a more complex issue. Readiness at this level involves

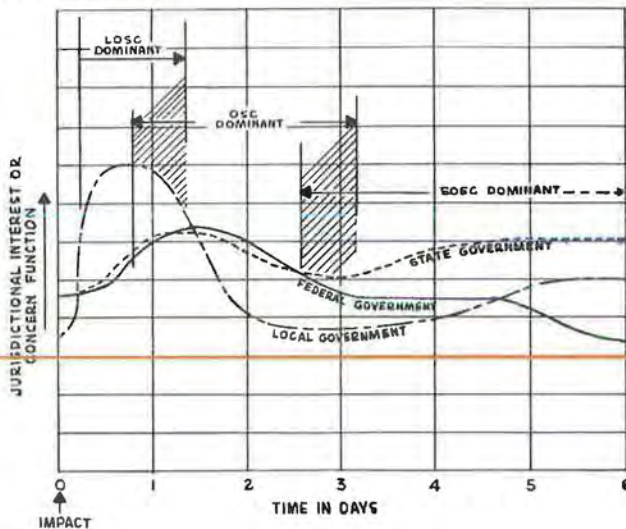
such things as evacuation plans, traffic control, hospitalization and housing plans, continuity of social services, and zoning. State and federal agencies can be largely concerned with response, but the local agencies must be profoundly interested in prevention as well as response.

A number of dangerous situations may affect the local community during or after a large release of chemicals. Some of these are explosion, fire, gaseous releases, and spilling or leaking of liquids. These may be immediate or delayed events. A long list of natural and man-made circumstances may also impact the magnitude of effect that these situations may impose on the local community. Climate, topography, soil mechanics, structures, forestation, water bodies, roads, people proximity, public awareness, and other factors can influence the outcome of the release. Of the situations described above, the most significant in the short-term, as far as public health, welfare, and safety are concerned, is the sudden release of a noxious or toxic gas. Although this is not said to downplay the long-term potential effects that may accompany such an event, the evidence is simply much clearer for local and short-term effects that are more quantifiable. Figures 3-7 indicate the significance of the short-term phenomena.

Figure 1. RRT meeting.



Figure 2. Jurisdictional interest or concern function or impact among various levels of government.



The forecasting of an event or determining the amounts and kinds of chemicals transported through a community are not normally controlled by the community. As an example, a county ordinance that prohibits the transport of any toxic chemical through the county may be in conflict with federal law at its inception. Federal law provides that interstate

Figure 3. Extreme local conditions.



Figure 4. Dispersion and winds aloft.



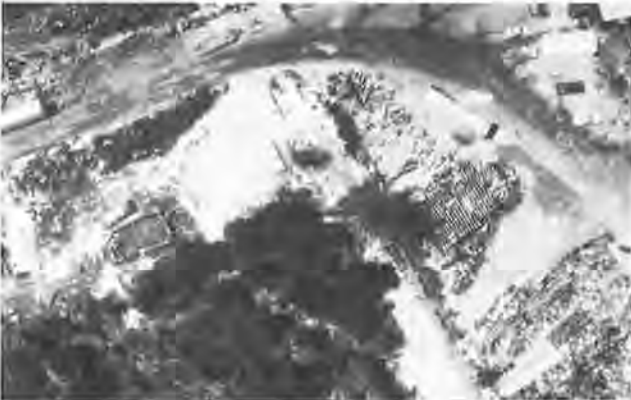
Figure 5. Dispersion and surface winds.



Figure 6. Implications involving surface winds and winds aloft.



Figure 7. Potentials from poorly stored waste chemicals.



carriers cannot refuse to transport a chemical that is properly labeled, contained, and loaded. Simply put, there is no way to keep chemicals away from the people; the people must be kept away from certain

chemicals. The word that comes to mind is zoning—not zoning in the classical sense and certainly not sterile zoning in which huge areas of land are left bare. Perhaps a concept of land use and time management that recognizes some of the ideas usually associated with classical zoning would at least provide a basis for study.

Zoning in this country has always been a local issue, but it is not inconceivable that federal and state regulators as well as local officials and industry advisory groups could draw on fundamental zoning ideas and land use concepts as laws are reviewed, rewritten, or created. Some of the ideas being tossed about here are as follows:

1. Time schedules of chemical deliveries in certain heavily populated areas;
2. Direction a building may face or where windows may be placed and style of ventilation systems, in circumstances involving structures located in close proximity to major chemical transportation routes or chemical storage areas;
3. Strategic use of natural wind or dispersion buffers as land is developed near these zones of chemical storage or transportation;
4. System whereby local or state governments would notify major interstate carriers of interim or short-term congestion in specific areas such as state fairs, major sports, or recreation events; and
5. Zones of concern, with degrees of concern relating to such things as natural hazards (bad roads, low speed limits, or frequent local flooding) being lined up or correlated with transportation vectors, and storage areas all transposed to a matrix that depicted times of high population risk.

The list goes on. Admittedly, these are shots in the dark and to some even the mention of the above ideas in the same breath with true zoning may be offensive. But, clearly, we are talking about risk analysis, responsibilities, and competing interests. Industry has made great effort in the past 5-6 years to prevent accidents and to be responsive to them when they occur. Government has worked side by side with the industrial sector to make positive things happen and this side of the story is rarely told. Nonetheless, all of these efforts will not close the circle. The public must participate to achieve this goal.

## National Overview of Emergency Response Under Superfund

H. D. VAN CLEAVE

This paper discusses the U.S. Environmental Protection Agency's program for hazardous material emergency response and the Superfund created by Congress to support federal cleanup of chemical spills and abandoned waste sites that threaten people or the environment. The active participation of state and local governments during hazardous waste emergencies is advocated. Efforts toward federal, state, and local cooperation are seen as the key to timely and effective response to the dangers from hazardous materials.

The primary responsibility of the U.S. Environmental Protection Agency's (EPA) oil and hazardous substance emergency response program is to protect the quality of the environment by preventing or minimizing the effects of spills or releases from hazardous waste sites. The program concentrates on environmental emergencies that pose an immediate threat to public health and welfare. EPA's Emergency Response Division is headquartered in Washington, D.C., and