Chapter 18. Conducting a Hazard Analysis

18.1 Hazard Analysis

The first step in a hazard analysis is to identify facilities containing EHSs or to identify transportation routes likely to be used for the transportation of these substances. An analysis will help you identify these and other hazards in your community. Emergency planners should try to answer the following questions:

- What are the major chemical hazards in our community?
- How can we determine the area or population likely to be affected by a release?
- What emergency response resources (personnel and equipment) does our community need?
- What kind of training do local responders need?
- How can we help prevent chemical accidents?

The hazard analysis process can assist local planners in answering these and other important planning questions.

There are three components of hazards analysis as it is applied to the EHSs. A brief overview is presented below.

18.1.1 Hazards Identification

Hazards identification typically provides specific information on situations that have the potential for causing injury to life or damage to property and the environment due to a hazardous materials spill or release. A hazards identification includes information about chemical identities:

- The locations of facilities that use, produce, process, or store hazardous materials.
- The type and design of chemical containers or vessels.
- The quantity of material that could be involved in an airborne release.
- The nature of the hazard (e.g., airborne toxic vapors or mists, which are the primary focus of this guide, as well as other hazards such as fire, explosion, large quantities stored or processed, or handling conditions) most likely to accompany hazardous materials spills or releases.

18.1.2 Vulnerability Analysis

A vulnerability analysis identifies areas in the community that may be affected or exposed; individuals in the community who may be subject to injury or death from certain specific hazardous materials; and what facilities, property or environment may be susceptible to damage should a hazardous materials release occur. A comprehensive vulnerability analysis provides information on:

- The extent of the vulnerable zones (i.e., an estimation of the area that may be affected in a significant way as a result of a spill or release of a known quantity of a specific chemical under defined conditions).
- The population, in terms of numbers, density, and types of individuals (e.g., facility employee; neighborhood residents; people in hospitals, schools, nursing homes, prisons or day care centers) that could be within a vulnerable zone.
- The private and public property (e.g., critical facilities, homes, schools, hospitals, businesses, offices) that may be damaged, including essential support systems (e.g., water, food, power, communication, medical) and transportation facilities and corridors.
- The environment that may be affected and the impact of a release on sensitive natural areas and endangered species.

18.1.3 Risk Analysis

A risk analysis is an assessment by the community of the likelihood (probability) of an accidental release of a hazardous material and the actual consequences that might occur, based on the estimated vulnerable zones. The risk analysis is a judgement of probability and severity of consequences based on the history of previous incidents, local experience, and the best available current technological information. It provides an estimation of:

- The likelihood (probability) of an accidental release, based on the history of current conditions and controls at the facility, consideration of any unusual environmental conditions (e.g., areas in flood plains), or the possibility of simultaneous emergency incidents (e.g., flooding or fire hazards resulting in the release of hazardous materials).
- Severity of consequences of human injury that may occur (acute, delayed and/or chronic health effects), the number of possible injuries and deaths, and the associated high-risk groups.
- Severity of consequences on critical facilities (e.g., hospitals, fire stations, police departments, communication centers).
- Severity of consequences of damage to property (temporary, repairable, permanent).
- Severity of consequences of damage to the environment (recoverable, permanent).

18.1.4 Summary

To have an accurate view of the potential problems in a district, the LEPC and TEPC would need to address all the steps outlined above in a hazards analysis. Each of the three steps should be followed even if extensive information is not available for each site. The process anticipates that local judgement will be necessary.

A detailed description on conducting a hazard analysis is provided in EPA's *Technical Guidance for Hazards Analysis, December 1987.* (*See the "Technical Resources" section for a link to this document.*)

18.2 Hazards/Vulnerability/Capability Assessments

These assessments are a way to find out what/where the HAZMAT threat is, who is vulnerable, and what capability exists to respond to an incident. This can be as simple or complicated as you choose.

- **Hazard/Threat Assessment:** Includes industry required to report under EPCRA, propane facilities, fuel storage facilities and other fixed facilities. Transportation-related threats on highways, railroads and airports should also be included. Determine the most hazardous chemical at these locations and the worst-case effects of a release of that chemical.
- **Vulnerability Assessment:** Review census data or other information available to the county to determine who and what lies within the vulnerability areas of the locations of hazardous chemicals in the community. Look for any special cases like schools, nursing homes, shopping malls and neighborhood populations.
- **Capability Assessment:** Look at what the jurisdiction has to respond to the threat. Look at not only county or municipal assets like fire departments, HAZMAT teams, law enforcement, emergency medical and other government-owned assets, but also private industry, which may have response teams or equipment. Plot these on the map. Once plotting is completed, look at the whole picture to find any deficiencies in response. Then make plans to fix them.