Section III. Systems Approach to Planning

The Role of the EMS in a Systems Approach to Planning

The potential for hazardous materials incidents exists almost everywhere. While occurring infrequently, chemical incidents are capable of endangering the health of specific individuals and the emergency personnel directed to assist them. People who have been seriously injured by a hazardous material have a greater chance of recovery without complications when appropriate emergency treatment is provided by trained prehospital EMS personnel at the scene, and the patient is transported to a facility having the most appropriate personnel and technical resources to manage his or her care. This requires an integrated emergency medical response. However, many local governments, private businesses, and hospitals do not have a tested integrated hazardous materials response plan in place that involves all of the responders. This has resulted in several problems including:

- On-site incidents have been poorly managed by first responders.
- Communication channels between the private sector and the public sector or among public responders have not been clearly identified and formalized.
- The medical community has not been firmly integrated into many response systems and may not be prepared to treat multiple casualties resulting from a serious hazardous materials incident.

EMS are a crucial link in the community response system for emergency preparedness planning. Not only are hospitals asked to treat patients who have been chemically contaminated at remote sites, but as repositories of hazardous materials themselves, are potential sites of hazardous materials incidents. Coordination and communication between hospitals and other elements of an Emergency Medical Services plan can best be achieved by hospital staff and physicians fully participating at local meetings for hazmat planning and protocol review.

EMS must acknowledge their role as a component of the community-wide emergency response system. Administrators must familiarize themselves with the contingency planning of other components, such as fire, police, and health departments, and understand what services are expected from hospitals. Optimally, EMS staff should be represented on planning committees that develop and periodically review these contingency plans.

A common characteristic of the successful management of chemical incidents is adequate contingency planning. Planning requires the involvement of an array of community institutions -- fire and police departments and community hospitals. **Not every hospital or EMS in an area needs to have an emergency department capable of handling hazardous materials patients.** In fact many communities have centralized such services into one major area hospital or shock trauma center.

However, all hospitals should be capable of performing decontamination and basic care since some patients may come in on their own -- not through the Emergency Medical Services (EMS) Systems. In addition, emergency department personnel must be knowledgeable about where to send patients for further specialized care.

The Spectrum of Hazardous Materials Incidents

Local and state EMS agencies should be able to participate in the response to a range of hazmat incidents from the individual level, to the multi-casualty, to the disaster level. The hospital and emergency medical responders are key components of the local response system. Planning should integrate hospital and EMS personnel, equipment, and supply needs into the state and local hazmat plans. In turn, the hospital must be familiar with these plans and know how to use them if it is involved in a incident that overwhelms its capabilities.

- Individual patient—a single individual is contaminated and must be transported to an emergency department:
  - — Can be an occupational or accidental exposure.
  - — May pose a problem in rural areas with small hospitals, or where there are low levels of hazmat skills and experience for EMTs.
- Multi-casualty — this situation is usually limited to a single location:
  - — Involves normal systems of transportation.
  - — Patients are usually treated at the same level facility as a single emergency response, but the demand on all systems is much greater.
- Disaster — disrupts a large segment of the community:
  - — May involve several locations.
  - — May involve additional units to the normal responders; such units are not part of the local EMS system, and these units may not know how it works.
  - — May involve long-range mutual aid; normal systems of transportation (ambulances) are inadequate or disrupted.
  - — Patients may be treated locally at different facilities providing various levels of care, or even outside of the area altogether.

While transportation incidents attract larger media attention, statistics show that almost 75% of all acute hazardous materials events, excluding fuel spills, occur in the fixed locations where they are used or stored. In addition, events resulting in death and injury occur almost 1.5 times as often in plants as in transit.

Hazardous material incidents range from small releases at a factory site to rapidly expanding events that endanger a community. Regardless of its size, an incident's successful management depends on preplanning. This preplanning often requires coordination between local, state, and federal agencies,

and industries, as well as those in the community who use and maintain stocks of potentially hazardous materials. Contributions to hazardous materials planning come from a variety of sources: regulations from the Joint Commission on Accreditation of Healthcare Organizations, state and local planning committees established by SARA Title III, state EMS agencies, and federal agencies.

JOINT COMMISSION ON ACCREDITATION OF HEALTHCARE ORGANIZATIONS (JCAHO)

In drawing up contingency plans, administrators of hospitals have significant guidance available from the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). The JCAHO establishes standards that must be met before a hospital can receive accreditation. A comprehensive accreditation survey occurs once every three years, with intermittent evaluation if a specific area of weakness is identified at the time of full review.

The Key Indicator Probe (KIP) system in the Plant Technology and Safety Management Standards is a valuable addition to the accreditation process. Before the JCAHO survey is conducted, KIPs define what the accreditation survey expects a hospital to have completed in order to comply with a specific standard. For example, JCAHO *standard* PL.1.11.1 describes the hospital's role in community-wide emergency preparedness plans. The description of the hospital's role in community-wide emergency preparedness plans is the *key indicator*. The *probe* for this key indicator presents the question "Is the role of this facility and other health care organizations and community civil services addressed in the program?"

Additionally, JCAHO *standard* PL.1.11.2 discusses procedures in response to environmental or man-made events. For the *key indicator* item "information about how the hospital plans to implement specific procedures in response to environmental or man-made events," there are five *probes*. These include: 1) Has the organization identified alternate sources of essential utilities? 2) Is there an emergency communication system? 3) Is there a procedure for identifying an alternate care site? 4) Are facilities available for radioactive or chemical isolation and decontamination? and 5) Is there a workable plan for total facility evacuation? Exhibit III-1 outlines the JCAHO standards and indicator probes that are relevant for treating chemically contaminated patients.

The emergency department standards include: 1) current toxicologic reference materials and antidote information (ER.5.2), 2) a list of referral and consultation services (ER.5.3), and 3) equipment for chemical incidents (ER.6.8.3). In addition, JCAHO standards and key indicator probes for a hazardous materials and wastes program (PL.1.10) and an emergency preparedness program (PL.1.11) are provided. A hospital can more readily comply with some JCAHO standards by using community response and public information systems mandated by SARA Title III.

Exhibit III-1
JCAHO Accreditation Standards for Hospitals, 1989

ER.5.2 Current toxicologic reference materials and antidote information are readily available in the emergency department/service, along with the telephone number of the regional poison control information center.

ER.5.3 A list of referral and consultation services is prominently displayed and includes, as appropriate, the regional coordinating office for radiologic emergency assistance, antivenin service, county coroner or medical examiner, police department, state and local health departments, ambulance transport and rescue services, tissue donation centers, and special care services not provided by the hospital.

ER.6.8.3 Standard drugs, antivenin (in geographic areas as indicated), common poison antidotes, syringes and needles, parenteral fluids and infusion sets, plasma substitutes and blood administration sets, and surgical supplies are available for immediate use.

PL.1.10 There is a hazardous materials and wastes program, designed and operated in accordance with applicable law and regulation, to identify and control hazardous materials and wastes; the program includes:

PL.1.10.1 policies and procedures for identifying, handling, storing, using, and disposing of hazardous materials from receipt through use and hazardous wastes from generation to final disposal;

PL.1.10.2 training for and, as appropriate, monitoring of personnel who manage and/or regularly come into contact with hazardous materials and/or wastes;

PL.1.10.3 monitoring of compliance with the program's requirements; and

PL.1.10.4 evaluation of the effectiveness of the program, with reports to the safety committee and to those responsible for other appropriate monitoring activities.

PL.1.11 There is an emergency preparedness program designed to manage the consequences of natural disasters or other emergencies that disrupt the hospital's ability to provide care and treatment; the program includes:

PL.1.11.1 a description of the hospital's role in community-wide emergency preparedness plans;

PL.1.11.2 information about how the hospital plans to implement specific procedures in response to environmental or man-made events;

PL.1.11.3 provisions for the management of space, supplies, communications, and security;

PL.1.11.4 provisions for the management of staff, including distribution and assignment of responsibilities and functions;

PL.1.11.5 provisions for the management of patients, including scheduling of services, control of patient information, and admission, transfer, and discharge;

PL.1.11.6 staff training in their roles during emergencies;

PL.1.11.7 semiannual implementations of the plan, either in response to an emergency or in a planned drill.

PL.1.11.7.1 The hospital's performance during implementation of the plan is evaluated, documented, and reported to the safety committee through the hospital-wide information collection and evaluation system.

Key Items		Probes
PL.1.10.3	monitoring of compliance with the program's requirements; and	a. Are reports of hazardous materials and waste monitoring programs presented to the safety committee? b. Are all hazardous materials and waste incident reports reviewed by the safety committee?
PL.1.10.4	evaluation of the effectiveness of the program, with reports to the safety committee and to those responsible for other appropriate monitoring activities.	a. Does the safety officer or other responsible individual(s) compare the results of the program with standards established by law, regulation, or the organization to evaluate the effectiveness of the program? b. Is the analysis reported to the safety committee and others as appropriate?
PL.1.11	There is an emergency preparedness program designed to manage the consequences of natural disasters or other emergency situations that disrupt the hospital's ability to provide care and treatment; the program includes:	Is there a current written program at the facility that addresses the responsibilities of the medical staff, the nursing staff, and support services during a variety of applicable emergencies, both within the organization and in the surrounding community?
PL.1.11.1	a description of the hospital's role in community-wide emergency preparedness plans;	Is the role of this facility and other health care organizations and community civil services addressed in the program?
PL.1.11.2	information about how the hospital plans to implement specific procedures in response to environmental or man-made events;	a. Has the organization identified alternate sources of essential utilities? b. Is there an emergency communication system? c. Is there a procedure for identifying an alternate care site? d. Are facilities available for radioactive or chemical isolation and decontamination? e. Is there a workable plan for total facility evacuation?
PL.1.11.3	provisions for the management of space, supplies, communications, and security;Does the facility's plan address the use of space, replenishment of supplies, and the loss of communication, security, and utilities?	

PL.1.11.4	provisions for the management of staff, including distribution and assignment of responsibilities and functions;	a. Does the program list staff roles and responsibilities during emergencies? b. Is there a reliable method for notifying staff of an emergency? c. Is there a procedure for assigning available staff that reflects staffing changes on various shifts and days? d. Was the plan tested during drills or actual implementation? e. Are staff lists current?
PL.1.11.5	provisions for the management of patients, including scheduling of services, control of patient information, and admission, transfer, and discharge;	Does the plan include procedures for: a. modification or discontinuation of less than essential services? b. moving of patients within the facility? c. relocating patients outside the facility in the event of an emergency? d. provision of appropriate medical staff services and physical facilities to implement the plan?
PL 1.11.6	staff training in their roles during emergencies; and	a. Is there documentation of the training and education of all personnel who have an assigned role in the emergency preparedness program? b. Can a random sample of staff adequately describe training they have received in the emergency preparedness program and in the fire plan?
PL.1.11.7	semiannual implementation of the plan, either in response to an actual emergency or in a planned drill.	Is there evidence of semiannual implementation, either in response to an emergency, or in a planned drill? NOTE: Drills separated by at least four months are acceptable. NOTE: Organizations that offer emergency services and/or are designated as disaster receiving stations must have at least one implementation per year that includes an influx of patients.

PL.1.11.7.1	The hospital's performance during implementation of the plan is evaluated, documented, and reported to the safety committee through the hospital-wide information collection and evaluation system.	Is there evidence: a. of evaluation of the emergency preparedness plan gathered from previous drills, changes in the mission or capability of hospitals, and changes in the community? b. in the community of a review of the effectiveness of the program, and changes made where appropriate? c. of critiques of each implementation addressing elements of hospital preparedness, staff preparedness, and patient management? d. for each critique, evidence of identification of problems, corrective actions taken, and recommendations for modification of the program? e. of a random sample of staff being asked about the drill? NOTE: Some organizations may not participate in a community-wide emergency plan. In these cases, item (b) is not applicable, and compliance with PL.1.11.7.1 will be scored: 1. a,c,d,e 2. 3 of 4 3. 2 of 4 4. 1 of 4 5. none in place

SARA Title III

Title III of the Superfund Amendments and Reauthorization Act (SARA), passed by Congress in 1986, provides for an infrastructure in states and local communities to plan for effective response to hazardous material emergencies. In addition, the legislation also provides for public access to information on the presence and releases of specified hazardous chemicals in communities.

Title III, "The Emergency Planning and Community Right-to-Know Act of 1986," required that each state establish a State Emergency Response Commission (SERC), which consists of members with technical expertise in emergency response, environmental and natural resources, public health, occupational safety, media, and transportation. The SERC is responsible for establishing local emergency planning districts (usually on a county level), appointing and overseeing local emergency

planning committees (LEPC), establishing procedures for handling public requests for information, and reviewing LEPC emergency plans.

SARA Title III requires that the local committees must include, at a minimum, representatives from the following groups: state and local officials, law enforcement, civil defense, firefighting, environmental, *hospital*, media, *first aid*, *health*, transportation, and facility owners or operators subject to the emergency planning requirements. The LEPC was primarily responsible for preparing a comprehensive emergency response plan for its district by October 1988, and for making information on hazardous chemicals, which is submitted under Title III, available to the public. Using information about the presence of potentially hazardous chemicals reported by businesses and other facilities under Title III, the LEPC was to have developed its plan.

As part of the planning process, the LEPC must evaluate available resources for developing, implementing, and exercising the plan. The plan must include the following:

- identification of facilities subject to planning provisions under Title III
- identification of transportation routes for extremely hazardous substances
- identification of risk-related facilities
- methods and procedures for response
- designated community and facility coordinators
- procedures for public notification
- methods for determining release occurrence and area affected
- description of emergency equipment and facilities and those responsible
- evacuation plans and training programs

Under Title III's planning provisions, EPA was mandated by Congress to establish a list of chemicals to help focus local emergency planning activities. In April 1987, EPA listed 406 Extremely Hazardous Substances (EHS) and established a Threshold Planning Quantity (TPQ) for each. If any business or facility contains one of these EHS, in an amount equal to or greater than its respective TPQ, the facility owner or operator is required to notify the SERC and LEPC. These facilities must name a facility coordinator to work with the LEPC for specific inclusion of that facility in the local plan.

Representative facilities covered under the planning provisions include not only major chemical manufacturing facilities, but also a wide variety of chemical users, such as farmers, dry cleaners, and other service-related businesses. Exemptions under this provision apply only to vessels (ship/boat), federal facilities, and transportation. Storage incidental to transportation is exempt provided that the EHS are still moving under active shipping papers and have not reached the final consignee.

Accidental releases of EHS and other hazardous substances identified in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) must be reported to the LEPC and SERC. This requirement ensures immediate notification to local response personnel. Other provisions of Title III provide further information on the presence, storage, and emissions of hazardous and toxic chemicals. These data further assist the LEPC in obtaining a fuller picture of chemical risk in the local district.

Emergency medical personnel can be better prepared for response to incidents that involve contaminated victims by actively participating in the LEPC planning process. Title III provides for the submission of information on hazardous and toxic chemicals as presented above. In addition, Title III contains a specific provision for the disclosure of chemical identity by facility owners or operators on chemicals for which facilities have made trade secret claims. Access to chemical identity assists health professionals, physicians, and nurses in obtaining further information for diagnostic purposes during emergencies and for prevention and treatment measures during nonemergencies.

The State Emergency Medical Services (EMS) Agency

Planning for hazardous materials incidents should include the appropriate linkage to the state EMS agency. The state agencies are responsible for overseeing a network of local EMS units, and thus are an essential part of the planning process. Often this body is part of the SERC.

Duties of the agencies vary from state to state. However, EMS agencies usually are responsible for medical management and medical control of first responders. EMS agencies develop medical mutual aid agreements between counties, and establish procedures for distribution of casualties between hospitals. In addition, these agencies maintain an inventory of disaster medical supplies. Further, EMS agencies develop and maintain communications protocols for on-site activities: between receiving hospitals and the base hospital, between base hospitals and ambulances, and between all hospitals and the Regional Poison Control Center. EMS agencies also work with counties in designating field casualty decontamination and collection points for a major disaster.

Suggested planning activities may include:

- Medical Direction — the local EMS agency should be contacted for information on how medical control is provided for the EMS system.

- Patient Destination — hospital emergency departments are able to provide supportive care. However, in some cases it may be more appropriate to take the victim to a hospital that has expertise in handling certain kinds of poison exposures. The plan should include directions for obtaining this information. One option is to go through the Regional Poison Control Center via the base hospital. The poison center will often know which hospitals are best prepared for which substances.

- Decontamination and Medical Management Protocols — the literature on the clinical management of hazardous materials exposures is sometimes inconsistent in its recommendations. Provision should be made in the plan for obtaining field and hospital medical management information from experienced physicians. For example, the Regional Poison Control Center can provide decontamination and medical management protocols via facsimile transmission or telephone to all receiving hospitals, and through the base hospital or via cellular telephone to EMTs in the field. They also have rapid access to experts.

- Coordination with Burn Centers, Hyperbaric Chamber Facilities, and Other Specialty Centers — provision should be made to alert and coordinate patient destination with various specialty care centers.

Federal Emergency Response Activities

Contingency planning is essential to the successful implementation of any system designed to manage chemically contaminated patients and to promptly contain the hazard itself. Contingency plans require a coordinated community response that may also involve state and federal agencies. Pre-planning and coordination of services are equally critical at the national level. A National Contingency Plan (NCP) has been established by the federal government to promote coordination of resources and services of federal and state response systems. To oversee this plan, a National Response Team (NRT) and National Response Center, a network of Regional Response Teams (RRTs), and a group of On-Scene Coordinators (OSCs) have been established.

The Hazardous Materials Emergency Planning Guide, referred to as NRT-1, provides guidance to help local communities prepare for potential hazardous materials incidents. The NRT-1 can be used by local communities developing their own plan, as well as by LEPCs formed in accordance with the "Emergency Planning and Community Right-to-Know Act" (SARA Title III) of 1986.

The objectives of the Hazardous Materials Emergency Planning Guide are to:

- Focus communities on emergency preparedness and response.
- Provide communities with information that can be used to organize the emergency planning task.
- Furnish criteria for risk and hazard assessments, and assist communities in determining whether a hazardous materials incidents plan is needed, in addition to the district-wide plan developed by the LEPC.
- Help LEPCs and individual communities prepare a plan that is appropriate for their needs and consistent with their capabilities.
- Provide a method for revising, testing, and maintaining community emergency plans.

The NRT-1 is published by the National Response Team, and was developed cooperatively by its 14 federal member agencies, including the Department of Defense, Department of the Interior, Department of Transportation (Research and Special Programs Administration and U.S. Coast Guard), Environmental Protection Agency (EPA), Department of Commerce (National Oceanic and Atmospheric Administration [NOAA]), Federal Emergency Management Agency (FEMA), Department of State, Department of Agriculture, Department of Health and Human Services (Agency for Toxic Substances and Disease Registry), Department of Justice, Department of Labor (Occupational Safety and Health Administration), Nuclear Regulatory Commission, and the Department of Energy. The NRT-1 represents a concerted effort by federal agencies to consolidate their general hazardous material planning guidance into an integrated federal document.

NRT-1 states that an emergency plan must include response procedures of facilities and local emergency and medical personnel, as well as a description of emergency equipment and facilities in the community. It also recommends that hospital, emergency medical service, and health department personnel be included as members of an emergency planning team. As previously mentioned, SARA Title III requires medical, hospital, and first aid personnel to be members of the local emergency planning committee. The NRT-1 describes relevant publications that provide specific operational guidance to emergency responders, such as the DOT's Emergency Response Guidebook for first responders, which provides guidance for firefighters, police, and other emergency services personnel to help them protect themselves and the public during the initial minutes immediately following a hazardous materials incident.

In addition, the document provides information on the Chemical Manufacturers Association's (CMA) Community Awareness Emergency Response (CAER) and the Chemical Transportation

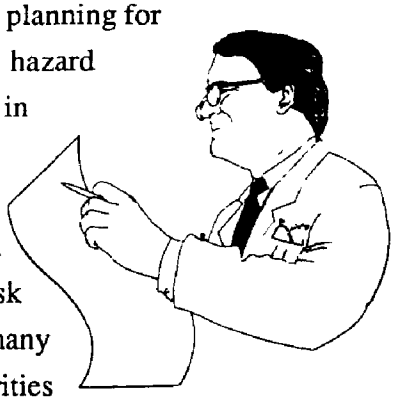
Emergency Center (CHEMTREC) programs. The CAER program encourages local facilities to inform local residents, public officials, and emergency response organizations about industry operations and to integrate their on-site emergency response plans with the planning efforts of the local community. In some areas of the country, the chemical industry has established physician networks. The purpose of the networks is to develop a better dialogue between company physicians and local health authorities. CAER has outlined that the following specific steps be taken: review the plant emergency plan, improve employee awareness and training, prepare a community relations plan, inventory the status of local emergency planning, develop a briefing paper, prepare a list of initial contacts, meet with initial contacts and identify key officials, establish a coordinating group, and begin implementation steps. On the federal level, EPA and FEMA provide technical assistance and guidance to local and state planners through the SARA Title III program.

The NRT-1 document also recommends that contingency plans include: standard operating procedures for entering and leaving sites, accountability for personnel entering and leaving sites, decontamination procedures, recommended safety and health equipment, and personal safety precautions. The document suggests that emergency plans include a list of emergency response equipment appropriate to various degrees of hazard using the EPA levels of protection (A, B, C, and D). Further, it recommends that the list include the type of respirator (e.g., self-contained breathing apparatus, supplied-air respirator, or air-purifying respirator), the type of clothing that must be worn, and the equipment needed to protect the head, eyes, face, ears, hands, arms, and feet.

In addition, the NRT-1 recommends that medical personnel be made aware of significant chemical hazards in the community to train properly and prepare for possible hazardous materials incidents. It also states that emergency medical teams and hospital personnel must be trained in the proper methods for decontaminating and treating persons exposed to hazardous chemicals.

Hazard Analysis

Hazard analysis is a necessary step in comprehensive emergency planning for a community. It is a three-step decision-making process comprised of: hazard identification, vulnerability analysis, and risk analysis. The first task in conducting analysis is to complete an inventory of the hazardous materials present in the community and describe the nature of the hazard. This is a key step because it permits planners to describe and evaluate risks and to allocate resources accordingly. However, the task of analyzing all relevant hazards may not prove cost effective to many communities. The planning committee therefore should assign priorities



to the hazards found in its community and establish affordable limits for analysis.It should be noted that several federal agencies (e.g., DOT, FEMA, and EPA) report that frequently encountered substances often pose the most prevalent dangers. These materials include fuels and chemicals, such as chlorine, ammonia, and hydrochloric and sulfuric acids. Such materials should be given special attention by the LEPC in the planning process.

In this context, a hazard is any situation that is capable of causing injury or impairing an individual's health. During the process of identifying hazards, facilities or transportation routes will be pinpointed that contain materials that are potentially dangerous to humans. The identification of hazards also should provide the following information:

- The types, quantities, and location of hazardous materials in the community, or transported through a community
- The nature of the hazard that would accompany incidents, such as explosions, spills, fires, and venting to the atmosphere

Hazards should be identified at as many facilities in the community as possible. These include the obvious ones such as chemical plants, refineries, petroleum plants, and storage facilities and warehouses. In requesting information directly from facilities, remember that SARA Title III planning provisions require certain facilities to provide the LEPC with any information on the facility that the committee needs to develop and implement its plan. Local emergency planning committees may provide assistance here, particularly if the LEPC has industry representatives on it. It is essential that these industries or businesses understand the role these data play in ensuring a sound emergency response plan. As previously stated, placing business or industrial representatives on the community-wide planning committee as required under SARA Title III may assist in gaining their cooperation. The cooperation and assistance of a facility that regularly deals with hazardous materials presents the local planning unit with a wide array of services. For example, such a facility can provide technical experts, spill prevention control and countermeasure (SPCC) plans, training and safe handling instructions, and cleanup capabilities.

In addition, hospitals and educational and governmental facilities should not be overlooked since they all contain a variety of chemicals. Major transportation routes and transfer points, such as airports, vessels in port, railroad yards, and trucking terminals, should be included in the overall hazards identification plan. SARA Title III planning provisions, for example, address many of these potential risk areas by requiring the following: facility cooperation in plan preparation, a wide range of chemical handlers (manufacturers to service-related businesses), and specific risk areas to be addressed in the plan (i.e., transportation).

Risk analysis includes the probable damage that may occur if a chemical incident occurs. Information that is necessary for a risk analysis includes:

- The type of risk to humans, such as an acute, chronic, or delayed reaction
- The groups that are at highest risk
- The type of risk to the environment, such as permanent damage or recoverable condition

Many documents can be of assistance in conducting a risk analysis. Risk analysis in transportation settings has been outlined in the DOT's "Community Teamwork: Working Together To Promote Hazardous Materials Safety, A Guide for Local Officials." In conjunction with FEMA and DOT, EPA published a supplement to NRT-1 in December 1987. This document, entitled *Technical Guidance for Hazards Analysis* and often referred to as the "Green Book," provides technical assistance to LEPCs in assessing the lethal hazards associated with potential airborne releases of extremely hazardous substances.

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