**Hazardous Materials: Managing the Incident, Fourth Edition**

**Chapter 7: Hazard Assessment and Rick Evaluation**

**Chief Concepts**

* Hazards refer to a danger or peril. In hazardous materials response operations, hazards generally refer to the physical and chemical properties of a material. Risks refer to the probability of suffering harm or loss. Although the risks associated with hazmat response will never be completely eliminated, they can be successfully managed. The objective of response operations is to minimize the level of risk to responders, the community, and the environment.
* Hazard and risk assessment is the most critical function in the successful management of a hazardous materials incident. The key tasks in this analytical process are:

(1) identifying the materials involved

(2) gathering hazard information

(3) visualizing hazmat behavior and predicting outcomes

(4) based on the evaluation process, establishing response objectives. The system that ties these elements together is the General Hazardous Materials Behavior Model.

* You must know how to use reference materials before the incident in order to use them effectively. Evaluate reference materials before use and make sure your references use the same definitions for hazard terms. A good guidebook should have a well-written “How to Use” section.
* Although reference guidebooks contain data on those chemicals most commonly encountered during hazmat incidents, they are usually not a complete listing of all the chemicals found in your community. There is no replacement for hazard analysis and contingency planning at both the plant and community levels.
* Each information specialist has their own strengths and limitations. It’s a good idea to remove the term expert from your vocabulary; be wary of self-proclaimed experts without first verifying their background and knowledge.
* Networking and relationships are everything! Local responders and facility personnel must get out into their communities and establish personal contacts and relationships with response partners. These include state, regional, and federal environmental response personnel, law enforcement, clean-up contractors, industry representatives, wrecking and rigging companies, and so on.
* There is no single detection/monitoring device on the market that can do everything. Make sure you understand how an instrument will fit into your standard operating procedures and emergency response strategies. Anyone can use an instrument; the challenge is interpreting what the instrument is (and isn’t) telling you and then making risk-based decisions to make the problem go away!
* The nature of the incident and the intent of the monitoring mission will drive the selection of monitoring technologies most appropriate for the incident.
* Emergency responders must understand the operating principles of the detection and monitoring equipment, its application and limitations, and the manner in which the instrument fits into existing response procedures.
* Unknowns will create the greatest challenge for responders. The nature of the incident (e.g., credible threat scenario involving WMD agents), the location of the emergency (e.g., outdoors, indoors, confined space), and the suspected physical state of the unknown (i.e., solid, liquid, or gas) will influence the monitoring strategy. In scenarios involving unknowns, the role of hazmat responders is much like that of a detective. At the conclusion of the testing process, responders may still be unable to specifically identify the material(s) involved; however, they should be able to rule out a number of hazard classes and shorten the list of possibilities.
* Initial air monitoring efforts should be directed toward determining if IDLH concentrations are present. Decisions regarding protective clothing recommendations, establishing hazard control zones, and evaluating any related public protective actions should be based on defined action levels for radioactivity, flammability, oxygen deficiency and oxygen enrichment, and toxicity.
* As a general rule, samples collected for product identification during emergency response operations should not be used for evidentiary purposes—collect a separate sample for evidence.
* An accurate evaluation of the real and potential problems will enable response personnel to develop informed and appropriate strategic response objectives and tactical decisions.
* To visualize likely hazardous materials behavior, five basic questions must be addressed:

1. Where will the hazardous material and/or its container go when released?

2. How will the hazardous material and/or its container get there?

3. Why are the hazardous material and/or its container likely to go there?

4. What harm will the hazardous material and/or its container do when it gets there?

5. When will the hazardous material and/or its container get there?

* Strategic goals are the broad game plan developed to meet the incident priorities (life safety, incident stabilization, environmental and property conservation). Essentially, strategic goals translate into “what are you going to do to make the problem go away?”
* Tactical objectives are specific and measurable processes implemented to achieve the strategic goals. In simple terms, tactical objectives come down to “how are you going to do it?”
* If you are unsure of the container damage or how the container is likely to breach, get assistance from product or container specialists. This may include railroad personnel, gas industry representatives, and cargo tank truck specialists.
* When petroleum products or chemicals are released into the ground, their behavior will depend on their physical and chemical properties (e.g., liquid versus gas, hydrocarbon versus polar solvent), the type of soil (e.g., clay versus gravel versus sand), and the underground water conditions (e.g., location and movement of the water table).
* Remember—your job is to be a risk evaluator, not a risk taker. Bad risk takers get buried; effective risk evaluators go home.