Coffee Break Training - Hazardous Materials

Petroleum Crude Oil: Hazard Assessment and Risk Evaluation

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Learning Objective: *The student will be able to explain the hazard assessment and risk evaluation process and the factors to consider for a safe and effective response to a crude oil rail transportation incident.*

The hazard assessment and risk evaluation process is a critical step to identify the level of danger posed by an incident involving product(s), containers and their behavior, which is generally related to their physical and chemical properties. It is one of the foundations for the risk-based response process outlined in National Fire Protection Association (NFPA) 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.*

Risk-based decision-making requires that Incident Commanders assess the hazards, evaluate the risks, and determine the appropriate response strategy based on the results of this process.

Risk-based decision-making is a systematic process by which responders analyze a problem involving a hazmat incident, assess the hazards, evaluate the risks, and determine appropriate response actions based on the facts, science and circumstances of the incident. The risk-based response model looks at the threat, vulnerabilities, consequences and likelihood of occurrence when making a risk-based decision. Risks refer to the probability of suffering harm or loss; they are different at each incident and need to be evaluated by the Incident Commander. The use of the risk-based response model will lead to a safer and more effective response to a crude oil rail transportation incident.

When collecting and evaluating information to determine the appropriate response strategy for a crude oil transportation incident, emergency responders should consider the following:

- Hazardous nature of the material(s) involved.
- Inherent properties and quantity of the material(s) involved.
- Design characteristics of the container.
- Type(s) of stress applied to the container and breach/release scenarios.
- Proximity of exposures and nature of terrain.
- Environmental factors (e.g., weather, topography, surrounding physical structures).
- Level of available resources (e.g., adequate foam supply, location of foam supply, response time and appliances/equipment).

Emergency responders can use a number of reference materials, such as the Emergency Response Guidebook, Safety Data Sheets, and technical specialists available by contacting the shipper or railroad or by contacting the Chemical Transportation Emergency Center at 1-800-424-9300, or the 24-hour emergency contact telephone number required to be included on the shipping papers by the federal hazardous materials regulations.

An initial benchmark to assess your agency's capability to successfully manage an incident involving a unit train carrying crude oil is your operational capability to respond to and successfully manage a gasoline tank truck incident (which typically involves approximately 9,000 gallons of gasoline). With regard to quantity of product, one tank car of crude oil is equivalent to approximately three gasoline tank trucks. The potential magnitude of this type of incident must be considered when preparing emergency plans and operational procedures.

Evaluate the risks of personnel intervening directly in the incident. Consider the limitations of the people involved and the ability to have adequate resources available on-site (e.g., sufficient firefighting foam concentrate, water supplies, appliances, equipment, trained personnel and technical expertise) and the ability to sustain operations for extended periods of time (hours or days). **If your agency is not fully prepared and capable in terms of resources, equipment and properly trained personnel to intervene, defensive or nonintervention strategies will likely be the preferred strategic option.**

Additional informational materials for first responders to better prepare them to respond to a crude oil rail transportation incident can be downloaded at http://www.phmsa.dot.gov/hazmat/osd/emergencyresponse. NFPA 472 can be accessed at http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=472.