Course Learning Outcomes for Unit VII

Upon completion of this unit, students should be able to:

1. Discuss the agencies and regulations pertaining to hazardous materials transportation.
2. Identify the DOT’s ten classifications of hazardous materials.
3. Contrast hazardous materials and ORM-D—Other Regulated Materials transportation regulations.
4. Explain the differences between a hazmat employee and a hazmat employer.
5. Determine the type of training a hazmat employee must receive.
6. Relate the *Emergency Response Guidebook of 2012* with the information in your textbook and understand the basics of how the sections in the ERG are arranged and applied to chemical spills.

Reading Assignment

**Chapter 14:**
Shipping and Storage of Hazardous Materials


Unit Lesson

The 1984 chemical release from a plant in Bhopal, India resulted in thousands of deaths and many thousands of injuries. Just as the 1986 Chernobyl nuclear plant disaster opened our eyes to potential nuclear plant hazards, the Bhopal release awoke the world to the hazards of unexpected release of manufactured chemicals. The Bhopal release, however, was an industrial plant release and not a release during transit.

Hazardous material transportation presents some unique challenges. Imagine a scenario where a tanker truck is hauling a hazardous gaseous material and is involved in a turnover or collision in your town. In the collision, the tank is damaged and the gas is escaping. It is not uncommon for this type of incident to require evacuation of residents of part of a city or all of a small community. Rail car accidents and turnovers/derailments offer some of the same potential hazards/exposures since they also often transport hazardous chemicals.

Often, we as a society fail to recognize and react properly to the hazards involved with scenarios such as the one depicted above, and do not take evacuation seriously. For example, the gaseous form of chlorine is a chemical commonly used in water purification systems in this country. A person in their home who hears an announcement that there has been an accident in their town involving a tanker truck filled with chlorine might just relate this to their chlorine bleach used to do the laundry every day or the chlorine that they use to sanitize the swimming pool and not think much of the truly hazardous situation. Chlorine gas was one of the world’s first chemical warfare agents and caused thousands of deaths in its debut performance. In that performance, its properties were used to the advantage of the opposing force who released the heavier than air gas upwind of their human targets and depended on its deadly properties to bring about the desired effect.

Other chemical spill issues that are likely to be misinterpreted by the general public, and even in some instances, by those involved in responding to the release, are situations where the original chemical if subjected to fire or water may change into another more deadly chemical. An example of this “morphing” that could be extremely deadly is the changing of sulfur dioxide (SO$_2$) when exposed to fire into hydrogen sulfide gas (H$_2$S). As anyone who has worked in the oilfield knows, a release of H$_2$S gas can be deadly within minutes to everyone exposed.
Many of the issues regarding transporting hazardous substances have been addressed in the past, but they are being evaluated and approached even more cautiously since September 11, 2001. Tools have been developed to aid first responders and others such as the Emergency Response Guidebook (ERG). Organizations such as CHEMTREC are ready to assist in case of a hazardous material spill including coordination of medical assistance to the area affected.

A much ignored program that can be useful in day-to-day evaluating and educating of employees on potential chemical exposures in plant operations is OSHA’s Hazard Communication Program contained in the OSHA Standard 1910.1200. This is a program that is in many cases nothing more than a group of MSDS sheets in a binder sitting on a shelf. Improvements in the MSDS program will help to raise awareness at all levels in a plant environment, including management and supervisors and those employees that handle or are involved in loading or unloading chemicals.

Go to [http://youtube.com](http://youtube.com) and search for “OSHA’s Revised Hazard Communication Standard.”

**Suggested Reading**

Review the material on the CHEMTREC website ([http://www.chemtrec.com](http://www.chemtrec.com)) for more information regarding hazardous materials.

Using the CSU Online Library, locate and read the following articles:


**Learning Activities (Non-Graded)**

**Reflection Paper**

For this activity, you are asked to reflect on the concepts covered in the reading assignment and the Written Lecture, and write about them. What did you understand completely? What did not quite make sense? The purpose of this activity is to provide you with the opportunity to reflect on the material you finished reading and to expand upon those thoughts. If you are unclear about a concept, this will give you a chance to write those questions down and email them to your professor for feedback. Can you apply the concepts you learned in this unit toward your career? How?

This is not a summary, but is instead a chance for you to express your thoughts about the material learned in this unit by writing about it.

The reflection paper should meet the following requirements:

- At least one page
- Contain your thoughts about the material and its value to you personally
- Contain any questions you may have concerning the material

Format your writing using APA style. Because this is not a graded assignment, it does not need to be submitted to your professor. This activity was designed to allow you an opportunity to put your thoughts down on paper so you can determine what concepts still may be foreign to you and give you a chance to ask your professor any questions you may have.