PRESENTER'S GUIDE

"WORK PRACTICES AND ENGINEERING CONTROLS"

Training for the
OSHA HAZARDOUS WASTE OPERATIONS
and EMERGENCY RESPONSE (HAZWOPER) REGULATION

Quality Safety and Health Products, for Today... and Tomorrow

OUTLINE OF MAJOR PROGRAM POINTS

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The following outline summarizes the major points of information presented in the program. The outline can be used to review the program before conducting a classroom session, as well as in preparing to lead a class discussion about the program.

- **Any doctor will tell you that the best way to treat a medical problem is to prevent it from happening in the first place.**
  - This applies to hazardous materials, as well.
  - The most effective method of protecting yourself from them is to stay as far away as possible.

- **Unfortunately, steering clear of these materials is often not an option if:**
  - Your company uses them in its work processes.
  - You work in hazardous waste operations or emergency response.

- **In these situations, your job requires you to handle unsafe chemicals... to contain, transport, or dispose of them.**
  - You won't be able to avoid them any more than a plumber can avoid working with pipes.

- **But you can still keep contaminants away from your face, skin and from out of your lungs if you take the proper precautions.**
  - This is what "work practices" and "engineering controls" are all about.
  - They make up your first line of defense against hazardous substances.

- **Work practices are <u>administrative methods</u> for isolating workers from hazardous materials.**
  - For instance, keeping non-essential personnel a safe distance from hazardous areas is a work practice that should be followed at all facilities.
  - Labeling chemical containers prior to shipment is a work practice that is used in transport situations.

- **In contrast to work practices, engineering controls are devices that keep employees away from hazardous materials... or minimize injuries, should they occur.**

- **Typical examples of engineering controls include:**
  - Pressurized equipment cabs.
  - Remote-controlled, material-handling equipment.
  - Ventilation systems for removing airborne contaminants.

- **The most common work practice is to keep personnel a suitable distance away from contaminated areas.**
  - Other than this, no single work practice should necessarily be followed at all worksites.

- **The most effective work practices can vary greatly, depending on:**
  - The chemicals involved.
  - The type of work that needs to be done with or around them.

- **For example, a typical work practice when using water-reactive flammables (such as lithium) is simply to keep water away from them.**
  - This means no water can be used when decontaminating workers exposed to these chemicals.
  - Also, fires involving water-reactive flammables must be extinguished with special materials.

- **You wouldn't follow this work practice, however, if you were dealing with non-water-reactive chemicals.**
  - Water is used to decontaminate these substances, and fires involving them can safely be put out with water.

- **Even the "universal" work practice, keeping workers away from HAZMATs, varies in terms of how far away workers should stay.**
  - This is because different substances can be hazardous to differing degrees.
  - For instance, a small methyl mercaptan leak might require staying at least 200 feet (60 meters) away to be safe.
  - While a similar quantity of sulfur dioxide would require twice as big a safety zone... over 400 feet (125 meters).

- **Because of these widespread variations, it's not always clear what the proper work practices really are for any particular situation.**
  - Fortunately, at every facility there is a document that describes all of them in detail... the "site safety and health plan."

- **The site safety and health plan contains information on the risks associated with every material and activity at the work site, and how to stay safe while you are working there.**
  - The plan is written by the Site Safety and Health Officer, and tailored to that particular workplace.

- **The work practices in the plan cover two major areas:**
  - Recommended procedures for performing specific tasks.
  - What to do during emergency situations.

- **Your Site Safety and Health Officer determines what work practices should be used through a process called "job safety analysis."**
  - Also known as "job hazard analysis", this is an examination of all the work activities at a site to determine the risks associated with each of them.

- **The Site Safety and Health Officer analyzes:**
  - Jobs that result in frequent accidents and injuries.
  - Jobs that aren't performed very often, such as many maintenance operations (this is done to identify hazards that many workers might not be familiar with).

- **The Site Safety and Health Officer also establishes emergency response measures for the worksite, another type of work practice. These are based on information from:**
  - Safety Data Sheets (SDSs).
  - Chemical guidebooks.
  - Hazardous materials experts.

- **These materials detail:**
  - The potential hazards of specific substances.
  - What personal protective equipment (PPE) to use in emergency situations.
  - First aid for personnel exposed to hazardous chemicals.
  - Procedures for bringing emergencies under control.

- **After all hazards are identified, and emergency response procedures are established, they are recorded in the facility's site safety and health plan.**

- **You should review the plan for any location where you are working.**
  - Read it before you perform any activity that could result in an injury or a health problem.
  - In addition to detailing work practices, the plan covers the engineering controls that you should use at the site.
  - It will also familiarize you with emergency procedures.

- **As with work practices, no single engineering control will apply to all facilities or all jobs. In some places, the engineering controls may be everyday tools.**
  - For instance, garden hoses are often used to spray water on hazardous dust, so that it will not become airborne.
  - Common chain-link fences are used to keep people away from hazardous waste sites.

- **On the other hand, engineering controls can also be highly specialized.**
  - For example, robot manipulator arms are often used to move drums of shock-sensitive materials, keeping workers out of harm's way.
  - Strong acids are often stored in vats made of tempered aluminum.

- **To get an even better understanding of engineering controls, let's take a look at ventilation systems, which are frequently used where airborne contaminants are present.**

- **Ventilation systems are necessary wherever there are unusually high concentrations of hazardous dusts, fumes or vapors... or where air circulation is bad, such as in:**
  - Confined spaces like tanks, pipelines and railroad tank cars.
  - Narrow excavations such as trenches and wells.

- **Any of these situations can be lethal.**
  - Without air adequately circulating into and out of spaces like these, the contaminants will linger.
  - In time, more contaminants will enter the space than escape from it, building up to potentially dangerous levels.

- **This is why engineering controls in the form of ventilation systems are essential in these locations. Ventilation equipment can:**
  - Expel hazardous airborne contaminants from work areas.
  - Draw fresh air in.

- **But not just any ventilation system will do.**
  - Different situations require systems that are suited to their specific conditions.

- **To select an appropriate ventilation system, a Site Safety and Health Officer has to determine:**
  - The sources and nature of the airborne contaminants.
  - How many people are working in the space.
  - How much air naturally flows through the area.

- **But those are only the initial decisions that need to be made. It’s also important to know:**
  - What sort of fan is best to use.
  - If a "hood" should be used to help capture contaminants.
  - The most appropriate kind of ductwork.

- **In some cases, the Site Safety and Health Officer may even need to consult a ventilation engineer for help in making these determinations.**

- **Ventilation systems remove hazardous substances from work areas, but this is not the only way to isolate people from dangerous chemicals.**
  - Other engineering controls keep workers away from unsafe materials through the use of remote-controlled equipment.
  - These devices can be as simple as the grapples found on some forklifts, or as complex as robot arms that can actually be used to mix chemicals.

- **In a sense, all of these devices are extensions of the human arm and hand.**
  - Remote-controlled manipulators allow people to handle objects and do work in all kinds of hostile environments without fear of injury.
  - If any of these devices are damaged or destroyed, it's a small price to pay when compared to losing a limb or a life.

- **Ventilation systems and remote-controlled equipment both <u>prevent</u> problems from occurring.**

- **Other types of engineering controls can keep bad situations from getting worse. These include:**
  - Spill cleanup tools.
  - Fire suppression equipment.
  - Eyewash stations found in many laboratories and manufacturing facilities.

- **Eyewashes are common in facilities containing corrosive or other hazardous substances.**
  - An eyewash station must be located wherever there is a high risk of dangerous chemical splashes.

- **There are several attributes a Site Safety and Health Officer will look for when selecting an eyewash.**
  - As with other engineering controls, OSHA and the American National Standards Institute (ANSI) have created an "eyewash standard."

- **According to this standard, eyewashes must:**
  - Be in an accessible location no more than 100 feet (30.5 meters) away from a HAZMAT work area, and be reachable within 10 seconds.
  - Spray water within one second of being turned on, and remain on until intentionally shut off.
  - Produce a uninterrupted stream of water for at least 15 minutes (this is the minimum amount of time that a contaminated eye should be rinsed).
  - Have water pressure that remains constant (to completely flush chemicals away).

- **All eyewashes need to be tested frequently to keep them in working order.**
  - Their pipes can't be allowed to clog.
  - Their bowls must be able to drain quickly, to prevent overflows.

- **When an emergency happens, engineering controls like eyewashes need to work.**
  - At that point, it's too late to fix any problems.

*** * * SUMMARY* * ***

- **Review your site safety and health plan before you start to work.**

- **Follow the authorized work practices that have been established for your facility or worksite.**

- **Know what engineering controls are available at your work site and how to use them.**

- **Familiarize yourself with what to do during various types of emergencies involving hazardous materials.**

- **Like snowflakes, no two sets of work practices and engineering controls are ever quite alike. But they do have two things in common.**
  - Their purpose is to keep people safe... and they only work if you use them the right way, every day!