PRESENTER'S GUIDE

"UNDERSTANDING CHEMICAL HAZARDS"

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.

- **You may have heard of hazard communication and "Right-To-Know" before, but you may not have thought about how it affects you.**
  - An ordinary cleanser can actually be toxic, flammable and explosive.

- **You have the "right-to-know" about potentially hazardous materials that may be encountered in your workplace.**
  - That is the reason for OSHA's Hazard Communication Standard and similar state laws.
  - The goal of these laws is to make sure that you have the information, training and equipment needed to work safely around hazardous materials.

- **Chemical hazard information is communicated to you in three different ways:**
  - Safety Data Sheets (SDS).
  - Container labels.
  - Your facility's written "hazard communication program."

- **The SDS is a guide for the safe use of a specific chemical.**
  - Chemical manufacturers and distributors provide an SDS for each of the products they sell.
  - Your facility keeps copies of each SDS on file for reference.

- **The Safety Data Sheet is the <u>primary</u> source for information about a chemical product. The SDS lists:**
  - All of the names which the chemical is known by.
  - The manufacturer.
  - Any hazardous ingredients.

- **The SDS also describes:**
  - The types of hazards that the chemical may present.
  - First aid procedures for chemical exposures.
  - Techniques for cleaning up spills.

- **To help you work with the chemical safely, the SDS also contains information about:**
  - How to handle and store the chemical properly.
  - What types of exposure controls and personal protective equipment (PPE) should be used for protection.

- **SDS's can come in different formats, but they all contain the same information.**
  - Become familiar with the SDS before working with a potentially hazardous material.
  - The few minutes this takes could prevent serious problems in an emergency.

- **Another place to look for "Right-To-Know" information is on a chemical's container label. The label will provide:**
  - The material's name and potential health, fire and reactivity hazards.
  - Specific precautions to take, or situations to avoid, when working with the chemical.
  - What PPE to wear when handling the chemical.

- **Like SDS's, all labels do not present information in the same way. They can:**
  - Be written.
  - Use shapes, numbers or letters as warnings.
  - Use "symbols" or "pictures" to represent hazards or the required PPE.

- **Whichever labeling system that your facility uses, read the label carefully before working with any chemical.**
  - If a chemical is transferred to another container, make sure that the "secondary" container is also labeled properly.

- **Another place where information about hazardous chemicals is located is your facility's "hazard communication program."**
  - It lists the hazardous materials present in your workplace.
  - Other important information is also given.

- **There are some technical terms which are used in communicating hazard information that you need to understand.**

- **The "duration of exposure" is the time that you are exposed to a substance.**
  - For example, the time between spilling a chemical on your arm and when you wash it off.
  - This type of spill would be referred to as a "short-term exposure.

- **"Short-term exposure" to some hazards can cause sudden reactions or "acute effects" such as a rash or a burn.**
  - In most cases, short-term exposure will cause no long-term health problems.

- **"Long-term exposure" to some hazardous chemicals can cause long-term... or "chronic"... health effects.**
  - For example, the chronic effect of smoking for many years might be emphysema or lung cancer.

- **The "dose" (amount) of the substance that you are exposed to is also important when determining possible health effects.**
  - The larger the dose, the more serious your reaction may be.

- **"Routes of entry" are the ways that a substance can get into your body. These include:**
  - Skin contact.
  - Inhalation.
  - Ingestion.

- **Solids, liquids and gases can all be absorbed through the skin.**
  - Liquids pose the biggest threat because they are most easily absorbed.

- **"Inhalation" is when a hazardous substance is breathed in. Substances that can be easily inhaled include:**
  - Dusts.
  - Mists.
  - Fumes.
  - Vapors.
  - Gases.

- **The third route of entry is "ingestion" (swallowing). This happens when:**
  - Food contaminated with a hazardous material is eaten.
  - A material is transferred to your mouth or face (with your hands).

- **Remember that the effects of exposure depend upon both the "dose" and the "duration of exposure".**
  - If these are low enough, a hazardous material may cause no negative health effects at all.

- **Government agencies have set limits for how much of any substance you can be exposed to safely. These limits are called:**
  - "Threshold limit value"(TLV).
  - "Permissible exposure limit"(PEL).
  - TLVs and PELs are listed on a chemical's SDS.

- **Hazardous chemicals have been grouped into classes, based on two things:**
  - The hazards they present.
  - The safety precautions needed when working with them.

- **Unlike many other chemicals, "toxic substances" have the potential to disrupt physical processes such as:**
  - Breathing.
  - Coordination.
  - Other bodily functions.

- **Toxic materials can often be found around the home... as well as in the workplace. They include:**
  - Pesticides.
  - Cleaners.
  - Solvents.
  - Gases.
  - Polymers.

- **Toxic gases include the fumes produced when heating, burning or welding some metals.**

- **"Poisons" are considered toxic substances.**
  - A poison can cause serious illness or death, even with a very small dose.
  - There are very few true poisons.
  - Their use in the workplace is limited.

- **Remember that not all toxic substances are poisonous.**
  - Most are not harmful in small amounts.
  - The danger lies in larger doses and longer durations.

- **"Corrosives and irritants" are two types of chemicals commonly found in many facilities.**
  - Corrosives can cause serious, even permanent, damage to any part of the body coming into contact with the chemical.

- **Most "acids" are considered corrosive substances. Sulfuric acid is one of the most widely used corrosives, and can be found in:**
  - Dyes.
  - Paints.
  - Petroleum processing.
  - Automobile batteries.

- **Many "bases" are also corrosives, such as caustic soda, which is commonly used in:**
  - Soaps.
  - Detergents.
  - Water treatment plants.

- **Skin contact with corrosive substances can cause redness, swelling, blisters and even severe burns.**
  - Contact with the eyes can result in permanent eye damage, even blindness.

- **Inhaling corrosive chemicals can seriously damage the delicate tissues of the:**
  - Nose.
  - Mouth.
  - Throat.
  - Lungs.

- **Swallowing corrosives ("ingestion") is rare in the workplace, but can result in:**
  - Extreme pain.
  - Severe internal injuries.
  - Death.

- **"Irritants" are often diluted forms of corrosive substances, and include:**
  - Ammonia.
  - Antifreeze.
  - Thinners.
  - Degreasers.
  - Acids.

- **Other irritants are by-products generated during combustion.**
  - Such as nitrogen dioxide found in automobile exhaust.

- **Irritants generally cause only minor, temporary inflammation or swelling at the point of contact.**

- **"Flammables and combustibles" are another common group of hazardous chemicals, which include:**
  - Gasoline.
  - Kerosene.
  - Acetylene.
  - Toluene.

- **The key in determining whether a chemical is flammable or combustible is its "flashpoint".**
  - This is the temperature at which the chemical releases vapors that can burn.
  - It is not the liquid that burns, but the vapor.

- **Liquids that have a flashpoint of less than 100 degrees Fahrenheit are considered flammable.**
  - Gasoline, for example, has a flashpoint of -45 degrees, almost always giving off vapors which can ignite.

- **A combustible liquid must have a flashpoint between 100 degrees and 200 degrees Fahrenheit.**
  - Combustibles are easier to control because they have to be heated before they will produce burnable vapors.

- **Liquid fuels are not the only flammables and combustibles we have to watch out for.**
  - Smoking near an open can of paint or a bottle of rubbing alcohol could cause a fire.
  - These and other materials can also ignite easily.

- **"Flammable gases" come with their own unique set of hazards, and include:**
  - Hydrogen.
  - Methane.
  - Propane.
  - Butane.
  - Acetylene.

- **Most gases are usually stored in compressed gas cylinders.**
  - The pressure inside these containers is enormous.
  - The rupture or heating of a cylinder or valve can result in a sudden, violent release of pressure.
  - The cylinder or valve could even become a flying projectile.

- **Another group of hazardous chemicals which we need to be aware of are "carcinogens and suspected carcinogens".**
  - These chemicals are often linked to cancer.
  - Normal cells in the human body follow a pattern to reproduce and grow.
  - Carcinogens disrupt this pattern, causing cells to grow abnormally, which is why cancer is often fatal.

- **Although carcinogens can affect nearly all areas of the body, they most frequently "target" specific organs, such as the:**
  - Lungs.
  - Liver.
  - Kidneys.
  - Reproductive system.

- **Unfortunately there are not usually any immediate symptoms of exposure to these substances.**
  - This is why it is extremely important to know about any carcinogen you may encounter.

- **One carcinogen that has received a lot of attention is asbestos. At one time, asbestos was used in:**
  - Pipe insulation.
  - Floor tiles.
  - Fire-proofing.
  - Automotive brake and clutch linings.

- **When inhaled, microscopic asbestos fibers can damage the lungs... and eventually cause cancer.**

- **"Suspected carcinogens" are commonly believed to increase the chance of getting cancer.**
  - Unlike confirmed carcinogens, no <u>direct</u> link has been established.

- **Examples of "suspected carcinogens" include**
  - Formaldehyde.
  - PCB's.
  - Carbon tetrachloride.

- **There is more to preventing cancer than simply avoiding exposure to carcinogens.**
  - Other "risk factors" affect the chances of getting cancer.
  - For instance, smoking increases the chances of getting cancer by tens or even hundreds of times.
  - Quitting is the biggest step in preventing cancer.

- **Another potential workplace hazard is "radiation".**
  - Radiation is not usually associated with chemicals.
  - But it can cause serious damage to the body's cells and tissues.

- **Radiation hazards include:**
  - Infrared radiation.
  - Ultraviolet (UV) radiation.
  - X-rays.
  - Gamma rays.

- **If you work around radiation hazards, you will need to take steps to protect yourself.**
  - Talk to your supervisor to find out more about any radiation hazards in your workplace.

- **Hazard communication goes beyond simply exercising your "right-to-know".**
  - You must act on what you have learned about potential hazards on the job.

- **Protection begins with selecting and using the appropriate personal protective equipment, such as:**
  - Goggles.
  - Face shields.
  - Gloves.
  - Acid suits.

- **"Respiratory protection" is especially important when working around many hazardous materials.**
  - There are many different types of respirators.
  - It is vital to use the right kind for the job.
  - Make sure your respirator fits properly.

- **When storing hazardous chemicals, a number of other things must be considered, such as:**
  - Ventilation (in case of fumes).
  - Lighting (for reading labels).
  - Identification of storage locations.
  - Strong, stable shelving.
  - Safe and easy access.

- **Small quantities of flammables or combustibles should be stored in U.L. approved cans with spring-loaded caps.**
  - These contain vapors and prevent spills.
  - Larger quantities of flammable materials need to be stored in a flammable materials cabinet.

- **Compressed gas cylinders have special storage considerations as well.**
  - They must be stored upright, with a safety cap over the valve.
  - A safety chain or bracket is required to prevent the cylinder from falling over.

- **In "exposure situations", you need to act quickly to minimize the damage from hazardous materials.**
  - Always know the nearest location of running water (water is usually the first line of defense against chemical injuries).
  - For small chemical splashes, immerse the effected area in running water for at least 15 minutes.
  - For larger exposures, get to a safety shower quickly.
  - Remove contaminated clothing and stay in the shower stream for at least 15 minutes.

- **Getting chemicals in your eyes can cause severe damage. Get to an eye wash station immediately.**
  - Keep you eyes open and flush them for at least 15 minutes.

- **Inhaling hazardous materials can be dangerous, even deadly.**
  - If someone is overcome by fumes, get them out of the area and into fresh air.
  - Check the container label or SDS to see if immediate medical attention is needed.

- **Swallowing a hazardous substance is extremely dangerous.**
  - Consult the SDS immediately.
  - It may be necessary to dilute the chemical with water or milk, or induce vomiting.
  - In some cases, however, vomiting may cause more damage.

- **Seek medical attention after <u>any</u> exposure to a hazardous material, no matter how minor.**
  - Some chemicals have delayed or long-term effects.
  - Supply medical personnel with the chemical's SDS.

- **In the event of a leak or a spill of a hazardous chemical, you must act quickly.**
  - The first concern is people's health and safety.
  - Tend to injuries immediately.
  - Evacuate the area if necessary.
  - Notify appropriate personnel.

- **If the spill is of a flammable or combustible substance, you should immediately remove sources of heat or ignition.**
  - But do not unplug machinery or equipment (this could cause sparks).

- **If you are going to be involved in cleaning up a hazardous spill, make sure to use the proper PPE and cleanup equipment.**
  - Check the SDS or your company's hazard communication plan.

- **First, work to contain the spill and minimize contamination.**
  - Create a barrier around the spill with an absorbent material.
  - Use a cleanup kit, if available.
  - In most cases you will need to absorb the spill with a neutral material.

- **Spills of some substances require special procedures.**
  - For example, use non-sparking tools when cleaning up a Flammable.

- **Hazardous materials cannot just be thrown into the trash.**
  - Many chemicals are classified as regulated waste.
  - They must be removed by licensed disposal companies.
  - Check with your supervisor or your facility's safety manager.

- **OSHA's Hazard Communication Standard and other "Right-To-Know" laws are there to get us the information we need to work safely.**
  - But only you can take the necessary steps to protect yourself from hazardous chemicals.