

PERSONAL PROTECTIVE EQUIPMENT AND DECONTAMINATION PROCEDURES

COURSE OUTLINE

- **Working around hazardous materials is a lot like war.**
 - You have to be on the offensive to prevent dangerous chemicals from escaping into the environment.
- **You are also on the defensive... keeping yourself safe from contamination and exposure.**
 - As in every other kind of war, you make use of defensive weapons.
 - In ancient times, the primary defensive weapons were shields.
 - In modern warfare, soldiers use radar and surface-to-air missiles to knock out incoming threats.
- **In the "war" that you fight, the "weapons" that will help you carry the day are:**
 - Personal protective equipment (PPE).
 - Decontamination procedures.
- **"Personal protective equipment" is a broad category. it covers:**
 - Chemical-protective clothing (CPC).
 - Respirators.
 - Hard hats.
 - Face shields.
 - Work boots.
- **You wear this equipment to protect yourself from things that can hurt you, such as:**
 - Vapors that could burn your skin.
 - Gases that might make you choke.
 - Falling or protruding objects.
- **"Decontamination procedures" deal with contaminants that might have accumulated on your protective clothing or your equipment.**
 - If these contaminants are not taken care of, they can transfer to you or even your coworkers.
 - The goal of decontamination procedures is to remove these unwanted substances, or to make them harmless before they can affect anyone.

- **To stay healthy on the job, you need both PPE and decontamination procedures.**
 - But neither one will keep you safe, if it is not part of a larger safety system.
- **This includes "work practices" and "engineering controls".**
 - These are the first lines of defense against contamination.
- **"Work practices" are administrative methods for isolating workers from hazardous materials. A common example is:**
 - Placing non-essential personnel far away from hazardous areas.
- **"Engineering controls" are devices for isolating workers from hazardous materials, such as:**
 - Pressurized cabs.
 - Remote-controlled material-handling equipment.
- **Work practices, engineering controls, PPE and decontamination procedures are all parts of a good safety program.**
 - When used together as a system of protection, they provide you with the best possible defense.
- **Now that you've seen the big safety picture, it's time to fill in some of the details about PPE and decontamination procedures.**
- **There are many forms of personal protective equipment.**
 - Combinations of PPE that are used together are grouped into four levels... A, B, C and D.
 - These categories are defined according to how much protection they provide.
- **"Level A" PPE is used in places where the most severe skin, respiratory, and eye hazards are encountered.**
 - In situations like these, the atmosphere is so contaminated that it cannot be filtered.
 - To survive, you must use a respirator that can supply you with pure, high-quality air.
- **Your respirator must also be able to maintain positive pressure.**
 - This means that a constant supply of fresh air is being forced into your facepiece, whether you are breathing in... or out.

- **There are two major types of air-supplying respirators:**
 - The self-contained breathing apparatus (SCBA).
 - The supplied-air respirator (SAR).
- **An SCBA allows you to breathe air from a portable tank.**
 - An SAR supplies air through a hose from a source located some distance away.
- **In Level A, the protective outfit that you wear with your respirator is called a totally-encapsulating suit.**
 - This provides the maximum possible protection against all kinds of exposure by keeping you isolated from the outside air.
 - To provide complete protection, a totally-encapsulating suit must be used with a chemical-resistant inner suit, such as Tyvek coveralls.
- **It is impossible to work in any level of PPE without proper gloves.**
 - This is especially important when you have to wear Level A gear, since you might end up touching chemicals that are corrosive or combustible.
- **Remember, the gloves you are using must be compatible with any hazardous materials that you handle.**
 - If your gloves are not compatible, they might fall apart... or even melt.
- **Your feet need protection as much as your hands.**
 - In Level A, this means wearing chemical-resistant boots with steel toes and shanks.
- **You are ready to take on the most hazardous of materials once you are fully outfitted with PPE from Level A, such as:**
 - Boots.
 - Gloves.
 - Respirator.
 - A totally-encapsulating suit.

- **While Level A protection is required wherever you face "immediate dangers to your life or health", Level B is used in environments that are slightly less hazardous.**
 - For instance, you would use Level B where supplied-air respirators are needed... but totally-encapsulating suits are not.
 - Unlike Level A, the main function of Level B chemical protective clothing is to guard against skin irritation and splashes... not lethal doses of gases or vapors.
- **Level B personal protective equipment consists of:**
 - A one or two piece chemical splash-suit with a hood.
 - A chemical-resistant inner suit.
 - Gloves.
 - Chemical-resistant boots with steel toes and shanks.
- **As you have seen, Level A and B protection allows you to work in places where the air itself might kill you.**
 - By contrast, Level C PPE is used where you can breathe the air... provided that you have a little help.
- **Skin hazards are also less of a problem in Level C environments.**
 - At most, the chemical-protective clothing used in Level C gives you the same degree of skin protection that Level B does.
 - There are some Level C areas where only everyday work clothes are required.
- **The real difference between Level C and the higher Levels of PPE involves the use of air-purifying respirators (APRs)... rather than air-supplying respirators.**
 - APRs do not have their own air supplies.
 - Instead, they filter contaminants out of the air before you can inhale them.
- **Unlike supplied-air respirators, APRs use the principle of negative pressure.**
 - This means that when you inhale, the air pressure inside your face piece is less than that of the outside air.
 - The power of your own breathing is what keeps air moving through an APR.
- **While respirators are required in many situations, you may also work in places that are so safe not even APRs are necessary.**
 - In these cases, you will be able to breathe the air normally and no filtration will be required.
 - This is where you would use Level D PPE.

- **Level D personal protective equipment guards against nuisance contamination and general safety hazards only. Typically, Level D includes:**
 - Coveralls that can protect you from materials that might stain your clothes.
 - Cloth or rubber work gloves.
 - Boots with steel toes and shanks.
 - Safety glasses.
 - A hard hat.
- **You might think of Level D protection as simply a work uniform.**
 - It must never be used on any site where respiratory or skin hazards exist.
- **Items like a hard hat and long underwear should be considered optional equipment for use with all levels of PPE.**
 - Long underwear absorbs perspiration, and can help keep you cool.
- **While it would be impossible to work around hazardous materials without PPE, the equipment can also cause its own problems.**
 - One of these is "heat stress".
 - This occurs when PPE interferes with your body's ability to cool itself.
- **When you are hot, you sweat. Normally, your sweat will evaporate, which is what cools you down.**
 - But when you are sealed up in chemical protective clothing, your sweat can't evaporate.
 - The longer that this situation continues the higher your body temperature will rise.
 - Eventually, you will develop heat stress.
- **Heat stress can cause disabilities that range from mild to fatal.**
 - The least dangerous of these is heat rash, also known as "prickly heat."
 - This is an inflammation of the skin that becomes worse as the temperature around you gets higher.
- **The most serious form of heat stress is "heat stroke".**
 - This occurs when the body can no longer cool itself.

- **Left untreated, heat stroke can be fatal. Symptoms include:**
 - Dizziness.
 - Nausea.
 - A severe headache.
 - Hot or dry skin.
 - A body temperature of 106 degrees or higher.
- **Of course, the best way to treat heat stress is to prevent it from happening in the first place. Your employer can help by:**
 - Alternating your work and rest periods.
 - Allowing you to work during the cooler times of the day.
- **You can help by drinking lots of water or beverages which replace the fluids and electrolytes that you sweat away.**
 - Electrolytes are chemicals that help your nerves to conduct electrical impulses.
 - Losing electrolytes through perspiration can cause a number of serious health problems.
 - Check your site safety and health plan to learn more about how to avoid heat stress.
- **In addition to heat stress, PPE can cause other problems as well.**
 - Most chemical-protective clothing is heavy and cumbersome.
 - It decreases your ability to handle things and your freedom of movement.
- **Wearing CPC can also make it more difficult for you to see and hear what is around you.**
 - For example, when you wear a totally-encapsulating chemical-protective suit, you see the world through two sheets of plastic (the facepieces of your respirator and the suit itself).
 - These can easily get fogged up or scratched.
- **Your ears are also covered by both your inner and outer suits.**
 - Since we rely on our eyes and ears to provide us with the information that we need to keep us out of danger, wearing CPC can increase the potential for some types of on-the-job accidents.
- **To cut down on your chances of having an accident, you must to be fully trained in how to use your PPE.**
 - Make sure that it is maintained properly.
 - Get used to the physical demands that your PPE places on you.

- **Alternating work and rest periods will help you to stay safe as well.**
 - The chances of developing heat stress or fatigue increase the longer that you work in CPC without a break.
- **All of these measures, when combined with your mandatory medical surveillance examinations, will ensure that you stay healthy on the job for a long time to come.**
- **Despite any problems that it might cause, personal protective equipment can do a great job of protecting you.**
 - But once you are through with it, your PPE must be decontaminated.
- **Contaminated PPE can be a source of the very substances that you need protection from.**
 - Because of this, decontamination procedures are critical whenever you work with hazardous materials.
 - OSHA has ruled that nothing can leave a site where hazardous materials are located without being decontaminated.
- **"Decontamination" is the process of removing hazardous substances or making them harmless.**
 - At a work site, decontamination usually takes place in what is called a "contamination reduction corridor" (CRC).
- **Using a CRC keeps decontamination activities within a limited area, and helps to make sure that workers who leave the site are not still contaminated.**
 - This keeps contamination from spreading.
- **Within the CRC, "stations" are set aside for decontaminating chemical-protective clothing and portable field equipment.**
 - You leave each station less contaminated than when you arrived.
- **Each of these stations has a supply of decontamination equipment and materials, most of which are common items. Decontamination tools include:**
 - Soft-bristled scrub brushes.
 - Large galvanized washtubs.
 - Children's wading pools.
 - Garden sprayers.
 - Metal or plastic drums.
 - Paper or cloth towels.

- **"Decontamination solutions" are usually nothing more than water mixed with detergent.**
 - If you are contaminated by a substance that will react with water, a specialized decontamination solution must be used.
- **Used decontamination solution and contaminated disposable PPE must be discarded in accordance with strict OSHA guidelines.**
 - For information on how this is done at your work site, see your supervisor.
- **Now, let's take a quick trip down a CRC.**
 - At the first station, you will drop off all of your tools for decontamination.
- **The "outer suit wash" is next.**
 - You step into a small pool, and are sprayed with soapy water from head to toe.
 - An assistant then scrubs your suit thoroughly with decontamination solution.
- **This is followed by a thorough rinsing.**
 - Your outer suit and SCBA are then removed, followed by your respirator face-piece, and inner suit.
- **Depending on the nature of the substances that you have been working with, you might have to shower after leaving the CRC.**
 - At the very least, you should wash your hands and face.
- **As a follow-up to your decontamination, you will probably have to undergo some kind of medical surveillance examination.**
 - This is routine and should be no cause for alarm.
- **The type of exam that you will receive depends on the kind of hazardous materials that you have been handling.**
 - Different chemicals have differing effects on the human body.
 - No one medical procedure can check for every type of exposure.

*** * *SUMMARY* * ***

- **When you are working with hazardous materials, contamination can be your worst enemy!**
- **To fight contamination, your PPE can include everything from coveralls and gloves to chemical protective clothing and respirators.**
- **Combinations of PPE that are used together are grouped into four Levels, designated Level A through Level D.**
 - Level A provides the most protection.
 - Level D provides the least protection.
- **Decontamination takes place in a contamination reduction corridor, which contains a number of different decontamination stations.**
- **Think of personal protective equipment and decontamination procedures as weapons.**
 - They protect you from an enemy that knows no mercy, an inhuman foe that will kill you if it can.
- **PPE and decontamination are your last... and most crucial... lines of defense. They are what you need to win the war against contamination!**