# GROWING TIMES

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## Routes of Pesticide Exposure

*Dermal, Oral, Inhalation...*

The three routes pesticides usually enter the body are through the skin, mouth, or through the lungs.

### Dermal:

The most common route for pesticide exposure is through the skin. The danger of dermal exposure is dependent upon the toxicity of the material, the concentration of the material, and whether the material is in a liquid or solid state. Most materials can be easily absorbed in liquid form; however, solids will usually have a lower absorption rate.

In addition to the chemical properties of the material, dermal exposures can vary greatly from one part of the body to another. Surprisingly, different parts of the body will absorb materials at different rates. Most pesticide labels advise applicators to wash hands before eating, smoking, or using the bathroom and there is a very good reason for this precaution. The absorption rate of the forearm has a rating of 1. The palm of the hand has a rate of 1.3 and the forehead has a rate of 4.2! That means the forehead absorbs materials 4 times the rate of the hand. So, if you wipe your sweaty brow on a hot day with your pesticide-contaminated gloves, you may do more harm than if you spilled the material on your hands! An area that is even more susceptible is the genital area. The genital area has an absorption rate of 11.8! At this high rate, if you don't wash your potentially contaminated hands before using the restroom, it could take a very small amount of material to cause a dangerous exposure!

### Oral:

Oral exposure to pesticides is rare, but can happen when pesticides are mistaken for food or drink, accidentally splashed into the mouth or, sadly, sometimes they are purposefully swallowed.

The most common cause for accidental oral exposure is when an unsuspecting person uses a food container that was used to store pesticides. Unfortunately, children under the age of 10 account for at least half of the accidental pesticide deaths in the United States. It is imperative that pesticides are NEVER placed in containers commonly used for food or household products!

### Inhalation:

Respiratory exposure to pesticides can be dangerous because the particles that make it into the lungs can be absorbed quickly. Our lungs have an extremely large surface area and are designed to facilitate gas exchange. This feature can make inhaling pesticide vapors or small particulates very dangerous.

It is important to read your pesticide labels carefully and follow the respiratory protection equipment instructions.

### INSIDE THIS ISSUE



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# Respirators

*Protecting against contaminates*

The human lung is an amazing organ. It's contained inside the body, yet it is in constant interaction with the atmosphere outside the body. Each day, an average adult breathes in approximately 8,000 - 9,000 liters of air. This air meets and oxygenates 8,000 - 10,000 liters of circulated blood. To accomplish this astonishing task, the human lungs have a very large surface area, some of which is extremely thin to maximize gas exchange. The surface area of a pair of human lungs is approximately 160 $m^2$. This equates to approximately the size of a tennis court!

Because our lungs are designed to take in so much air on a daily basis, this action can expose the human body to a number of contaminants. Spray mists, gases, organic vapors, dusts, and particulates are examples of some inhalation hazards. When protecting employees in the workplace against potential inhalation hazards, effective engineering controls and work practice are the best means to protect workers. When these practices can't provide the needed level of protection, a respirator must be used to protect workers from being exposed to a hazardous PEL.

## What is a PEL?

PEL stands for "Permissive Exposure Limits". These limits are set by the US EPA to protect workers from contaminants in the work place. Different materials will have varying PEL limits. For example, the pesticide sulfuryl fluoride (Vikane) has a PEL of 5 ppm, whereas propane has a PEL of 1000 ppm.

## Why shouldn't respirators be used as a first line of defense against contaminants?

It is best to use engineering controls to limit the exposure to a chemical rather than to rely on safety gear to do the job. Relying solely on a respirator to protect a worker from a contaminant is risky. A cracked seal on a respirator or saturated cartridges can easily expose a worker to a toxin.

An engineering control is basically any action or device that can be used as a first defense against a toxic material. Examples of engineering controls include a positive pressure tractor cab, use of forced ventilation, or the choice to use a less toxic chemical. When it's not practical to use an engineering control, pesticide applicators must rely on spray techniques and respirators to provide a suitable level of protection.

## When do you need to change respirator cartridges?

The need to change a respirator cartridge is based on many different factors. Respirator manufacturers provide user guidelines to follow when it comes to this subject. Many will suggest a certain "change-out" schedule. However, experience and professional judgment should also be used when you design your respiratory program.

Respirators do have limitations, so it is vital that all manufacturers' instructions are followed. All respirator cartridges have a limited service life and there are many variables that can limit the use of a respirator cartridge. Some of the factors limiting the life of cartridges are the hazardous material's concentration, outside humidity, temperature, and the user's breathing rate. Once the cartridge reaches its capacity, the material you are hoping to filtrate can pass through the cartridge and contaminate the worker.

## Respiratory Training Plan - §6738(h)(3)

Every employer with employees using respirators must have a written operating procedure describing their respiratory program. These procedures must describe how to select, fit, clean, sanitize, inspect, and maintain respiratory protective equipment. Many companies will incorporate the written booklet that comes with their employee's respirators into their training packet. Most of these respirator information booklets provide great detail on how to select, fit, clean, and maintain the respirator. Incorporating these booklets into your respiratory program is an acceptable way to comply with this section. If you decide to use the booklet as a training guide and an integral part of your written respiratory program, make sure you keep a respirator booklet with your training materials to show that you have complied with all of the requirements of this section.

## Medical Condition Statement

Prior to an employee's use of a respirator, the employee must be informed that certain medical conditions may interfere with wearing a respirator. A medical condition statement must be on file for each employee assigned to work that requires the use of a respirator. Make sure the employee remembers to mark "I have __ " or "have no __ " medical conditions on the form. Employees that mark "I have" on the form must have a physician's note stating they can wear a respirator for work.

# What is Mad Cow Disease (BSE)?

July 24, 2003
Food Safety Network Fact sheet
http://www.eatwelleatsafe.ca/factsheets/madcowbse.pdf

Mad Cow Disease or Bovine Spongiform Encephalopathy (BSE) is a chronic degenerative illness that affects the central nervous system of cattle. It is part of a family of diseases known as transmissible spongiform encephalopathies, or TSEs, whose different forms affect different species of animals. All TSEs are believed to be linked to an abnormal form of a protein known as a prion. Accumulation of this abnormal protein leads to a sponge-like appearance of the affected brain, causing neurological illness and eventual death. The disease has a long incubation period of four to five years, but is fatal for cattle within weeks to months of its onset. Diagnosis of BSE is not possible in live animals and can only be done by examining an animal's brain after death. Few cases of BSE have occurred outside of the United Kingdom (UK).

A human form of TSE was first diagnosed in the 1920s and was named Creutzfeld-Jacob disease (CJD) after the two German scientists who described the illness. Classical CJD (cCJD) occurs naturally in the population at a rate of approximately one person per million individuals per year, making it extremely rare. On average, 30 Canadians are diagnosed with cCJD each year, with an average age of 60 years. There is no known cure for the disease.

In the early 1990s, British researchers noted a new illness having many of the classical CJD symptoms, but with several unique characteristics. Most notably, the emerging illness affected people in their late 20s. In 1996, researchers confirmed a new variant of CJD, now called vCJD. The cause of vCJD appears to be the consumption of beef and beef products from cattle infected with BSE. Following this discovery, strict measures were put in place in the UK and elsewhere to control the spread of BSE among cattle and to minimize the risk to human and animal health.

Scientists believe that the BSE epidemic in Great Britain was caused by feeding cattle meat and bone meal supplements that had inadvertently become contaminated with the disease agent. This occurred in the late 1970s and early 1980s, and established the infection in cattle. It was then magnified by the practice of feeding rendered material from slaughtered cattle back to other cattle. The agent that causes BSE is very resistant to normal disinfection procedures such as heat. This means that the agent may not be destroyed in the rendering process, and could remain active in the rendered material. In 1988, Great Britain banned the use of this rendered material in animal feeds, thus removing potentially contaminated material from the food chain. In addition, other possible methods of transmission are still being scientifically investigated.

# Putting Mad Cow Disease Into Perspective

*Risk factors*

The recent discovery of BSE in the State of Washington has received a lot of media coverage. Why has the media focused on this one food-borne disease? It might be due to the fact that "Mad Cow" was discovered as recently as 1986, or it could be due to the catchy name. We're not quite sure why this one food-borne disease has received so much attention, especially when there are many more food-borne diseases that are much more serious in the United States.

The Center for Disease Control estimates that known pathogens account for over 14 million illnesses in the United States each year. Of these pathogens, the big 3 are Salmonella, Listeria, and Taxoplasma. These 3 pathogens alone accounted for a majority of the food-borne illnesses and caused 1,500 deaths in the U.S. this past year. From 1990 to January 2004, there have been approximately 19,000 deaths from the three major pathogens of Salmonella, Listeria, and Taxoplasma in this country. When you compare that number with the 139 confirmed cases of vCJD in the United Kingdom from 1990 to January 2004, it puts things in perspective!

## Grassland Restoration Seminar

This free workshop will provide a valuable source of information on grassland ecology and management.
When: February 10, 2004
Where: Santa Clara County Fairgrounds
Time: 8:30 - Noon
C.E.: 3 hours of continuing education credit
Seating is limited. Call (408) 918-4626 by February 6th to reserve a seat. The agenda for this workshop is available on our website: http: www.sccagriculture.org