NIOSH

WORKING SAFELY WITH PESTICIDES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health

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Division of Technical Services
Cincinnati, Ohio

March 1976

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

HEW Publication No. (NIOSH) 76–147

Single copies are available from:
Division of Technical Services
National Institute for
Occupational Safety and Health
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Working Safely with Pesticides

When you make materials that people use to get rid of pests, like insects, mold, rot, plant blight, rats, mice, plant-eating soil pests, snails and slugs, weeds and grasses, and others, you may be exposed to dangerous chemicals — unless you know how to take care of yourself. These products are made to poison and destroy some living thing, plant or animal, and many of them are dangerous to people as well if they are handled carelessly. Always treat them with respect. Before you handle chemicals used for pest control you owe it to yourself to study this booklet thoroughly. It is designed to help you learn how to avoid any injury to your health that might result from working with or around pesticides.

The pesticide industry is important to the American way of life and it gives our country the means to help feed a hungry world. About 70% of our most important food crops just couldn't be grown without pesticides.

In a short booklet like this, we can't give you all the details, but we have furnished general hints on how to stay safe and healthy when working with these chemicals. Your foreman or supervisor should be able to provide more detailed information or know where to find it. If he doesn't know the answer, he should try to get detailed safety and handling instructions from the company supplying the material. Always read labels on containers before you open them. It may save you from having a serious injury.

Don't get hurt!

Be sure to keep all chemicals — solids, liquids, or gases — off your skin and away from your eyes. Be sure you don't breathe the vapors or dusts. Don't get the material on your food by eating with unwashed hands or from objects that have been in the work area. Know the ways chemicals can enter your body: through the eyes and skin, by breathing, and by eating.

Eyes

You can not only be blinded by certain pesticides — and that is a big danger — but chemicals splashed in the eye can also enter your bloodstream and cause poisoning.

Particles are dangerous too. They can scratch or irritate your eyes. Or the particle can dissolve and cause further damage. If something gets in your eye, keep your fingers out — the only safe thing to rub your eyes with is your elbow. If you don't think that's safe, try it.

Protect your eyes. The easiest way to do this is to keep everything out of them that doesn't belong. You can't do much with your eyes shut, so wear safety glasses or goggles in all work areas. The type of eye protection to use will depend on the job, and your foreman or supervisor should see that you have the appropriate type.

Don't depend on reading glasses or contact lenses for protection

In fact, many doctors think wearing contact lenses is worse than wearing no glasses at all because they can trap material behind them, especially chemicals.

Anything that gets in your eyes should be washed out with flowing water until you can get medical help. If it is a solid particle, and a doctor or nurse is not readily available, somebody trained in first aid should be called on for help in getting it out. Use an eye bath or other source of clean flowing water immediately if liquid chemicals are splashed into your eyes and keep on washing your eyes with clear water for about 15 minutes.

SKIN

You may think, as many people do, that your skin will protect you from poisons as long as you don't have any cuts or open wounds. Probably the worst thing you would expect would be some itching or burning on your skin. But there are many chemicals that actually pass through your skin and get into your bloodstream, where they can make you sick or build up in your system. This is true of many of the pesticides, especially the insecticides. It happens sometimes even when you can't see any sign of injury or itching on your skin. Of course, if your skin is broken the chemical can get in even faster.

Many chemicals that don't go through the skin can still cause skin problems — redness, blisters, or dry scaliness. The doctor usually calls this dermatitis or eczema. Once you have a skin problem like this, it is easy to pick up infections that can give you real discomfort and even cause you to lose time from work.

Strong caustics and strong acids actually burn the skin. Certain other chemicals can cause rashes, boils or pimples (acne). The doctor usually calls this "chloracne".

Solvents used in pesticides can dissolve the oils out of your skin and leave it dry and flaky. If you are exposed to these solvents very often or leave them on your skin or clothing for any length of time, they are likely to cause eczema just the way the pesticides themselves do.

SKIN PROTECTION

Some chemicals that don't actually affect your skin and aren't absorbed very fast can still get into your system if you don't change your clothes as soon as they get contaminated.
Considering all the problems you can run into when you work with chemicals, you should do your best to keep them away from your skin. The best way to do this, of course, is to keep all pesticides in the equipment or in closed containers. When there is any danger of being splashed, you should wear the proper protective clothing, such as long-sleeved, moisture-resistant coveralls, protective hats or caps, gloves, and boots. In addition to the usual eye protection (safety glasses or goggles), you may have to wear a full-face shield when there is a real danger that pesticides may get splashed on your face.
Be certain that the inner surfaces of all protective clothing are clean and free of pesticides. Never wear gloves which have holes, cuts, or tears that could permit the pesticides to contact the skin of your hands.

After working around pesticides, always wash your hands, face, and any other bare skin before you smoke, eat, or go to the bathroom. Remember, chemicals can be absorbed through the skin of the crotch area faster than through any other skin of your body, so wash your hands carefully before using the toilet facilities and not only afterwards.

If you have long hair or wear a hat, remember that your hair and the sweatband can pick up chemicals from your hands or from the air and hold them against your forehead and scalp. Be sure to keep your hat clean and change the sweatband frequently. Wash your hair at the end of the workday to remove any chemicals. Naturally, if it is hot and you have been sweating, liquid chemicals, gases and dusts stick to you.

Don't wear or carry leather articles into the work area. Chemicals are easily absorbed by leather and very difficult to remove. They can later irritate your skin. Your shoes should be covered. Chemicals can be trapped under watches and jewelry and remain on your skin unnoticed. Leave all jewelry in the locker with your street clothes.

Whenever you have been working with dangerous pesticides, especially insecticides, take a shower and change your clothes before you go home after work. In your shower/locker room, you should have two lockers of your own — one for your work shoes and anything else that isn't changed daily — the other for your street clothes.

Don't take dirty work clothes home to wash. This would expose others in the family to the chemicals. Generally, work clothes should be washed at the plant or sent directly to a professional laundry for thorough cleaning.

If a chemical is splashed or spilled on your skin, wash the area at once. If quite a bit of chemical gets on your clothes, hurry to get under the nearest shower, strip them off, and shower and wash for at least 15 minutes. If the spilled material is known to be a poison, or if there is any chance that it is, see a doctor immediately.

If the supplier of the chemical furnishes a safety booklet or a pamphlet with a note to the physician, show it to the doctor. The label should give you information on its danger.

Never put your bare hands into any chemical. That would just be asking for serious trouble and you might not live to regret it.

Remember!

1. Keep pesticides in proper containers or equipment.
2. Wear protective clothing.
3. Keep clean.

Don'ts to observe

Don't smoke before washing hands.

Don't use toilet facilities before washing hands.

Don't wear dirty clothes or hardhats with dirty sweatbands.

Don't take dirty work clothes home.

Don't put your bare hand into chemicals, wet or dry.

BREATHING

You are more likely to get injured from breathing fumes and vapors of pesticides or breathing the dust than by contact with the liquid or solid itself.

The lungs pass the oxygen you breathe into the bloodstream and they can pass chemicals too. This makes breathing the most direct way of getting chemicals into the bloodstream. And once they get in, they can do all sorts of damage. They can damage the lung itself or plug it up; when they get into the blood they can injure almost any part of the body, including the liver and kidneys. Some chemicals warn you of their presence in the air.

Before they can do any actual harm their odors may drive you away from the area, or they may cause sneezing, or smarting eyes — even vomiting — without doing any permanent harm to your system. On the other hand, most chemicals don't give you fair warning and it is possible to be poisoned before you are aware of the danger.

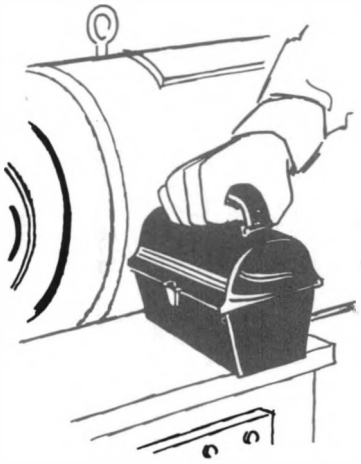
Your employer should have samples of air taken in your work area and studied by an industrial hygienist. If it is found that there are dangerous concentrations of chemicals in the air, your employer should eliminate them. Until this can be done, you will have to be provided protective breathing devices.

If the chemicals are easy to remove from the air, your employer may provide a chemical respirator. This fits over your mouth and nose and filters the air you breathe. If you use a chemical respirator, be sure it fits properly. Sideburns and beards may allow air to leak around the edges. Be sure to clean and disinfect the facepiece before wearing the respirator and be sure the absorbent cartridge is changed often enough to do the job it is made to do. Your foreman or supervisor will give you instructions for the use and maintenance of respirators. The box containing the respirator and the cartridge should be stamped with a certification of approval by NIOSH (National Institute for Occupational Safety and Health) or MESA (Mining Enforcement and Safety Administration).
With some chemicals you may even have to work in a helmet with its own air supply or in a protective suit.

We have already mentioned the danger of smoking before washing your hands and face when you have been working with pesticides. This warning can't be overemphasized, because the heat of the cigarette will vaporize chemicals on the cigarette and pass them directly to your lungs. Don't forget that cigarettes can get contaminated just by carrying them around in the work area. Keep them in the locker with your street clothes.
Large dust particles and droplets you breathe in may get trapped in your nose and throat. In time these can end up in your stomach, where they can make you sick. This is an indirect method of eating chemicals.

Watch what you eat!

We know you wouldn't purposely eat pesticides, but you may be doing just that without knowing it. Even if you can't see or smell the chemical on your hands, you can carry enough pesticide from the work area to make you sick if you don't wash your hands and face thoroughly before lunch or coffee breaks. You can also get sick on food that has been exposed to a chemical atmosphere. Make it a rule never to carry food into the work area and never to wear or carry contaminated clothing into the lunch room.
Keep food out of work areas.



KEEP FOOD OUT OF WORK AREA

DON'T EAT WHILE WEARING CONTAMINATED CLOTHING

HANDLING

Before you handle any chemical, you will have to have the proper equipment. It is your employer's responsibility to ensure that such things as clean protective clothing, hats, respirators, boots, and goggles are used when needed. It is important for you to read the labels on materials you work with, and to ask questions of your supervisor if you have any doubts about the safety of your plant or your working methods.

Make sure you know where to find emergency equipment in a hurry when you need it. Find out the location of eye and safety showers, fire extinguishers, and the like. Check from time to time to make sure they work or have been inspected.

Before you operate any equipment, be sure it is ready and safe to use, with all guards in place, all connections and covers tight, all ventilating equipment operating safely, all valves open that should be open and all valves closed that should be closed.

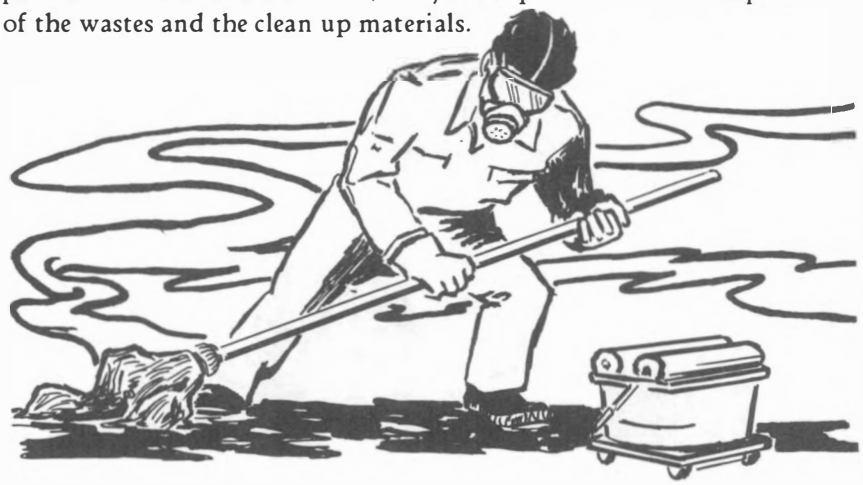
MAKE SURE ALL GUARDS ARE IN PLACE

If you are using a flammable solvent, check to make sure that there are no open fires in the area. Smoking around chemicals creates the danger of fire or explosion in the work area. It may also poison you.

Never work alone around chemicals. If a leak or malfunction of the equipment occurred, you could be exposed to poisonous vapors and lose consciousness. If you are working alone, who will be in the immediate area to rescue you?

Use the buddy system — be sure somebody is with you at all times. Be sure you know what to do in case of emergency.

In case of a spill, clean it up immediately to keep the pesticide from spreading and contaminating the whole work area. When cleaning up spills, be sure to ask your supervisor how to do it and follow procedures recommended. Also, ask your supervisor how to dispose of the wastes and the clean up materials.



If you notice anything unusual happening, follow emergency procedures and notify your supervisor at once. Some things to watch for are these:

- Unusual odors
- A motor overheating
- Pressure building up in a pipe
- Leaks of liquid or dust
- Temperature going up faster than normal

Remember to wash or shower immediately if chemical gets on your skin. If chemicals get on your work clothes use the emergency shower and take off the contaminated clothing (see the section titled "SKIN").

Your supervisor should know all the necessary safety and handling precautions and know when to have you use protective equipment on the job. Chemical manufacturers usually provide the information your company needs to identify the hazard and to use their products safely.

At the end of the working day, be sure to clean up the equipment and do a thorough job of cleaning the whole work area, including floors, scales, etc. Remember — *don't* use a broom and *don't* use air to blow things around.

If a truckload or freight car of chemicals arrives at your plant with broken or leaking containers, don't unload it unless you are sure the chemical is not dangerous.

If it is dangerous, somebody from your company should phone the supplier for information on how to handle the situation.
If the supplier can't be reached, contact the National Agricultural Chemicals Association (Telephone No. 1-513-961-4300), or in an emergency, the Manufacturing Chemists Association ("Chemtrek" Telephone No. 1-800-424-9300). In certain cases one of the above may send somebody out to your plant to help you unload and repackage the material or dispose of it.
It is a good idea to have clean gloves and shoe coverings available at the dock to put on in case you have to get up on the truck to load or unload. This helps prevent contaminating the truck. Always change shoe coverings before changing gloves. Containers lined with plastic bags should be handy for the soiled gloves and shoe coverings if you do change.

STORAGE

Be careful how you store chemicals. When they are allowed to stand for any period of time, some chemicals can spoil or change chemically. Moisture breaks down many chemicals and causes them to lose potency against pests, but they can still be hazardous to you.
Be sure they aren't stored where they'll get hot. Heat tends to break down many chemicals, and some may even explode.
On the other hand, some liquid chemicals will be ruined by freezing or may separate if they are kept in the cold. These can also be dangerous to handle.
Before storing, check the label and follow directions.

Never store chemicals near food or materials which might get in food!

Always keep chemicals in the original container until they are used. A material stored without the label can be mistaken for another product and cause a serious problem — even an explosion — when mixed into a formulation. Never use the contents of an unmarked container.

If you are moving chemicals with a forklift truck or some other powered vehicle, be careful not to damage the container with your equipment. Chemicals have to be treated with respect.

If containers are damaged and you have a leak, get it stopped and cleaned up before the chemical spreads. (A simple way to stop a leak in a non-pressurized container is to turn it so that the leaking surface faces up.) Be sure you know how to clean up the area safely, and dispose of the waste and the used cleaning materials. If you haven't cleaned up this particular chemical before, be sure to get advice from your supervisor.

Don't operate a gasoline-powered vehicle in a closed area. Carbon monoxide fumes from the motor are deadly. Don't close doors in a garage or loading area when truck motors are running.

FORMULATING

Pesticides are usually used as a formulation. That is, the material that actually controls the pest is mixed with other ingredients, especially solvents, and sometimes with other additives. If water is to be the "carrier" and the material doesn't dissolve readily in water, emulsifiers are used. These are chemicals that make it possible for you to mix materials with water even if they aren't normally water soluble.

Besides water, many other types of solvents can be used. Some called chlorinated solvents, like those used in drycleaning, are commonly used as vehicles. Vapors of the chlorinated solvents are very dangerous to breathe. They can produce a "high," dizziness, or even unconsciousness in workers exposed to them and can cause permanent damage to the kidneys, liver, and nervous system in workers exposed to them over a period of time.

Kerosene and similar petroleum products are also used as solvents for pesticide formulations. The chief danger of products like kerosene is that they are flammable or combustible.

Solution formulations are usually made by putting materials into a tank, where they are mixed. Pesticides should never be added from an open bucket.

Always handle chemicals in a closed pumping system or ventilated pumping hood. NEVER leave a pump unattended while it is running.

Watch your step while formulating!

When you are formulating pesticides, you can be exposed to danger during several of the steps. The greatest danger occurs when you take concentrated material out of a tank car or a large container, such as a 55-gallon drum, and add it to the mixing tank.

Never let concentrated chemicals get into the air, on your skin or clothing, or on anybody else's. Be sure the pumping system is in good condition. The pump, pipe unions, and valves must be leakproof.

It's a good idea to make a dike ahead of time around pumps or other spots where you think a leak may occur so that leaks can be kept from spreading. If all the pumps can be kept in one area, it is easier to keep any leaks from spreading and to control vapors.

Many pesticide concentrates come in solid form and have to be melted before you can pump them out of their containers. Melting can cause dangerous fumes, so take special care. Also be careful not to heat the material beyond a safe temperature, because many materials can change chemically when heated and can then explode. Melt the material with extreme care and keep the water bath, drum heater, or other device used for melting at a temperature below the danger point. The manufacturer should provide information on safe melting.

Keep melting temperature within the range of safety

When adding components of a formulation to the mixer, if there is any possibility that splashing may occur, be sure to wear a face shield.
Splashing can happen as materials are added, during the filling of the cans with the finished product, or any time the mixer paddles are moving. Play it safe. Use adequate protection.

Remember that heating materials builds up pressures and you have to allow them to escape to keep equipment from exploding.
When you are heating pesticide materials in a tight system, there should be proper safety release valves on the system so that pressure is released before the system blows up. These valves will have to be checked from time to time to make sure they work properly.
Be especially cautious when you add flammable solvents to the mixer. If the pipes aren't properly grounded or the solvent has to fall through the air into the mixer, static electricity can build up and touch off an explosion. Try to have the filling pipes touch the mixing tank.

MIXING PRECAUTIONS

When mixing wettable powders, dusts or granules, you have to take precautions to avoid exposure when you add them to the mixer.
If the pesticide is sprayed into the mixer, be sure there is adequate ventilation. Remember, when you put something into a mixer, air is forced out, and this air will carry some of the pesticide with it.
If there is a solvent in the concentrate solution, this solvent may be driven off before the formulation is complete. If the solvent is toxic or flammable (or both), be sure your dryer has adequate exhaust ventilation to keep vapors out of the work area. If you can smell solvent around the dryer, report it to your supervisor.

Another important caution — remember that mixers will mix anything that goes in — clothes, arms, fingers . . . Don't take chances, *never* wear ties or loose-fitting clothes around a mixer.

EMULSIFIABLE CONCENTRATES

Emulsifiable concentrates are pesticide formulations that can be diluted to give a stable emulsion for spraying, which makes them convenient products for the end user. There are two main types: one is prepared by dissolving the pesticide in a solvent that can be further mixed with water and broken up fine in a colloid mill or mechanical homogenizer. The second is made by dissolving a non-liquid pesticide in a solvent with emulsifier added. Working with either of these types of emulsifiable concentrate presents the same dangers as working with other pesticide formulations. Be especially careful when you work around a colloid mill or a homogenizer. Both revolve at high speeds and must be provided with guards to keep clothing, fingers, etc. from being caught and pulled into the equipment.

FUMIGANTS

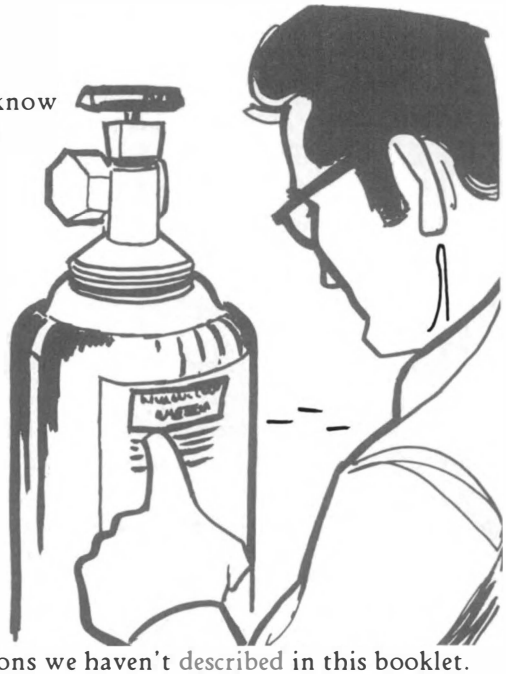
Fumigants are used in a number of ways. For example, they are used to kill insects in grain, to destroy roaches and termites in buildings, and to kill insects and other pests in the soil before planting crops. Most fumigants are liquids when they are kept very cold, but they can easily turn into gases, even at what you might think of as fairly low temperatures. For this reason, fumigants should be kept as cool as possible when they are handled in the formulating plant. Usually a formulator doesn't do any mixing — he just repackages the fumigants — but this in itself is a dangerous operation. The air-moving and cooling systems have to be checked frequently and kept in good working condition and the workers have to be carefully protected from exposure.

This includes filled cylinders which might leak under pressure. Many fumigants have no smell or taste, so they can't be detected without special instruments. When you are working with fumigants, your work area must be well ventilated and the air you breathe should be tested frequently.

You shouldn't work with fumigants in unventilated areas without a respirator to remove the fumigant from the air you breathe. Your supervisor should know which type of respirator you should wear. This is very important because some respirators do not give enough protection. You may have to wear a canister gas mask or air-supplied hood or mask.

Remember — always wear suitable protective devices when they are recommended, and be careful when entering an area where fumigants are handled.

Read any labels and booklets provided by the chemical manufacturer and be sure you know the dangers of working around fumigants.



There are additional formulations we haven't described in this booklet. If you are making one of these less common products or using unusual methods, consult your foreman or supervisor about the specific hazards of the materials and equipment and learn how to work with them safely. Once again, the labels and the manuals put out by the producers of the chemicals should be consulted.

PACKAGING

The big problem in the packaging area is dust and vapor control. As was true of the mixer, the air in the container gets pushed out during the filling operation and carries some product with it. If the problem can't be controlled adequately by ventilation, you should wear a respirator when you are in that area. Good ventilation and good housekeeping are essential to prevent blowing poisonous dusts and gases around.

HOUSEKEEPING

Is housekeeping important? In a pesticide-formulating plant it certainly is, if you value your health. The danger of exposure to chemicals can be minimized by keeping the work area cleaned up frequently. Here is where you can really do something positive to protect your health.

If material gets on a switch, on a doorknob, or on a valve handle, you can be sure it will get on some worker's hands and be transferred to his mouth, eyes, and other exposed body areas. If a pesticide gets on the floor it will be picked up on shoes and tracked to locker rooms, lunch rooms, and elsewhere. Eventually it will be stirred up and end up in the air you breathe. As you have learned, most pesticides, especially insecticides, are dangerous chemicals, and many of them can be absorbed directly through your skin. Needless to say, if the work areas are kept clean, there is no reason for you to worry about skin contamination from the floors and equipment.

Good housekeeping means not leaving a pile of dust or a puddle of solution on the floor until the end of the day before cleaning it up. Your own safety and health depend on cleaning up the mess as soon as it appears, and then fixing any leaks that could produce more puddles or dust piles. Don't forget the warning — *never* use a broom or compressed air in cleaning up such spills. Brooms and compressed air stir material into the air and spread it over a wider area. Using steam or hot water is generally *not* a good way to clean up spills because either one tends to evaporate liquid chemicals into the air or disperse dusty materials. THE SYSTEM TO USE IS A VACUUM, fitted with a special filter. After vacuuming, wash with soap and water or a chemical cleaning solvent. Always check with your supervisor about the proper cleanup method for large spills.

Some materials may stick to surfaces in the work area and be hard to get off because they won't dissolve easily in water. In many cases your supervisor will have you use a dilute acid (acetic or muriatic) or a base (ammonia, washing soda, bleach, etc.) to break down the original material to something that will dissolve in water.

Don't forget to protect your hands and skin, because these cleaning materials will burn. If you use a chemical solvent to clean work surfaces, be sure not to breathe the vapors. To be safe from breathing poisonous solvent fumes, it is a good idea to wear an organic canister respirator that will filter all the solvent vapors out of the air.

Be particularly careful if you have to use a chemical solvent in an enclosed area such as a pit or a closed room. In such instances you will probably need a special breathing device with supplied air rather than a canister respirator.

WASTE DISPOSAL

After you've cleaned up equipment or taken care of spills of poisonous chemicals, you will have the problem of getting rid of the waste. Cleaning up spills and leaks has to be done properly, and you have to know how to handle the job before a spill happens. Find out the proper way to do it from your foreman or supervisor and follow the correct procedure every time. Never skip any steps.

Keep rags for cleaning in properly labeled metal containers and keep covers over containers holding oily or greasy rags. If they are not covered up, they may heat up by themselves and catch fire.

Follow your supervisor's instructions about disposing of rags used for cleanup.

Before you dispose of any waste chemicals or used containers, check with your supervisor. Poisonous chemicals and materials that have been in contact with such chemicals shouldn't just be thrown out into the backyard or on a rubbish heap, or poured down a sink.

They are extremely dangerous to animals, fish, and people if they get into the environment.

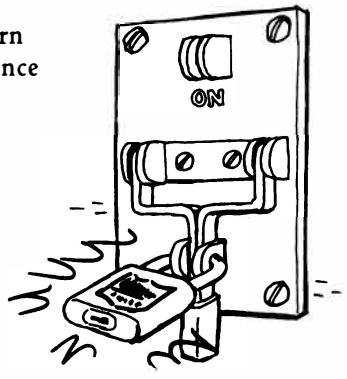
Bags that have held pesticides cannot be used over again, but can — and usually should — be burned. Even if they are burned, that operation has to be done carefully in a suitable area where smoke and fumes can be controlled or contained. The burning should be done by somebody who understands the dangers and knows how to prevent danger to people and contamination of the environment. The only place metal drums can ever be reused is in the formulating plant itself and then only for holding chemicals and only after they have been thoroughly cleaned and decontaminated. To decontaminate a drum, you have to wash it with a solvent that will completely remove all traces of the chemical. This should be done in a well-ventilated area. You should wear proper protective clothing and equipment to prevent contact with the materials.
Glass containers should be rinsed, broken and buried in a dump that is approved for handling the disposal of pesticides. If you can't reuse a metal container in the plant, destroy it by puncturing the top and bottom and have it buried in the dump, but be sure you clean and decontaminate it thoroughly before you destroy it.

MAINTENANCE

Maintenance in work areas where pesticides are handled or formulated creates a constant danger of contact with poisons. When you are doing maintenance work always use the buddy system. Always make sure that someone who knows about the dangers and who is properly protected is with you.

Before you start . . .

Before you start working on any equipment be sure all the agitators, pumps, grinders, conveyors and other moving parts are turned off. Check to make sure the electricity is off and that there are locks on the switches so nobody can turn them on again until the maintenance is finished and everybody is clear of the area. Be sure you know where the eye showers and safety showers are located before you start work.



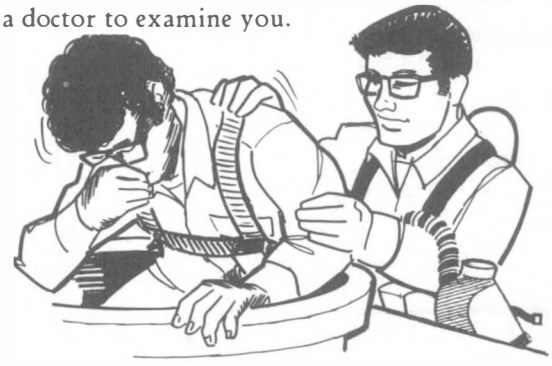
Be sure electricity is locked "off"

Also be sure all equipment is drained and flushed before you begin working on it. This is especially important with pesticides that can be absorbed through your skin. When you approach formulating equipment, be sure you are properly covered with protective clothes, such as gloves, coveralls and the like, and keep them on all the time you are working on the equipment. If you have to loosen or open pipes, pumps, reactors or anything else that may contain material under pressure, treat them as if you know they'll be full — wear rubber gloves, a rubber suit, and a face shield.

If you have to enter a tank, kettle, pit or any enclosed space, prepare for it ahead of time. Be sure the tanks are emptied, washed, and blown out with fresh air before you get in, because most chemical vapors are heavier than air and will keep air from getting down to the bottom of a tank or pit. And be sure that the air in the tank has been tested before you go in.

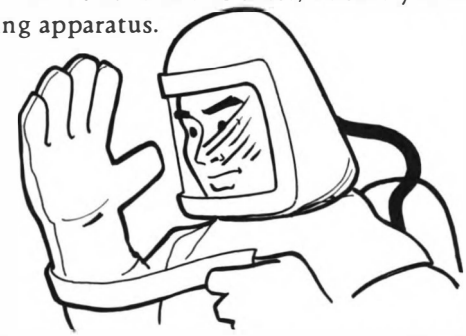
It is usually required that you wear a safety harness while in the tank and be sure another person is watching you from outside all the while you are working. This person should be equipped with the proper apparatus, such as an air-supplied breathing unit in case he has to go in to rescue you. If the tank has been used for fumigants, it must be inspected with particular care before anybody enters it.

If you are in a tank, pit or other enclosure and you begin to feel dizzy, *get out right away* and get a doctor to examine you.



If the enclosed area cannot be cleaned and aired as thoroughly as we have recommended, be sure you are completely covered and use the proper breathing apparatus. Put on rubber gloves pulled over the arms of your suit and pull boots over the legs, then carefully tape the gloves and boots closed. If you are wearing coveralls, you will have to cover your neck too.

Preferably use an air-supplied hood tied around the collar to protect your whole head. If you don't have one of these, be sure you do wear a self-contained breathing apparatus.



Don't treat this advice lightly. If a person enters a tank full of vapors without adequate protection, he may quickly get sick and become unconscious. And once he's unconscious, if he isnt pulled out promptly he may die.

When you finish your maintenance work, get out of your protective equipment. If you can't take your protective equipment off right at the job site, take the shortest path to an area where you can. This will prevent spreading contamination all over the plant from your equipment.

Take a shower and put on clean clothes before you do anything else. If you were wearing a rubber suit, you should have it washed down at the work site before you get dressed. This will keep you from getting contaminated by the suit as you get out of it.

When the maintenance operation is completed, somebody will have to check over the equipment and the whole area to make sure safety guards are in place and that pipes, pumps, flanges, and fittings are all tightened. When everything is ready for safe operation, you can take the locks off the electrical and mechanical switches and start operations up again.

If you have to do any welding or cutting as part of the maintenance, work on clean surfaces in a clean area free from flammable vapors and materials. Never use chemical (chlorinated) solvents in any area where cutting or welding is being carried out. If you have used such solvents in cleaning up, allow time for thorough drying and then blow away any vapors thoroughly before using a torch. Heat and flame can break this vapor down to produce extremely irritating and poisonous gases.

Don't weld or cut with a torch when solvent vapors are present

FIRST AID

Your employer must provide at least one person on each shift who is properly trained to administer first aid. First aid kits approved by a consulting physician must be readily available.

Your supervisor should explain to you what can happen if you are overexposed to pesticides and the other chemicals used in making pesticide formulations. If you notice any of the symptoms after being exposed to these chemicals notify your supervisor immediately. Your employer should make arrangements with a local doctor, hospital, or clinic for prompt attention. Your employer should supply the medical people full details on the kinds of chemicals you will use, so that they will know the proper treatment in case you are affected. This information is readily available from the companies that supply the chemicals — sometimes it is right on the label. Your employer may ask you to have a physical examination or a blood test when you are working with these materials. These tests often can indicate overexposure before you feel anything. Be sure to cooperate.

The most important first aid measure you can learn is washing whenever you have been exposed and at all break times. If you are wearing a bandage, remove it when you wash, clean the area thoroughly and put on a new bandage.

If pesticides are spilled or splashed on you, be sure to wash the exposed skin with soap and water for at least 15 minutes. Change any contaminated clothing promptly and shower well before putting on clean clothes. Then the doctor or medical facility that takes care of your company's pesticide exposures should be called and told of the type and nature of the exposure.

If you feel dizzy or sick on the job, report immediately to your foreman or supervisor. If there is any chance your illness is due to chemicals, see a doctor.

If you ever feel itching or burning on your skin while you are working with chemicals, stop what you are doing right away and immediately wash the burning or itchy area thoroughly with soap and water.

If you smell unpleasant or unusual odors, leave the area immediately and report it. If your mouth, nose, or eyes feel itchy, leave the area and wash them. For itching of the eyes, use a special eye bath or another source of clean fresh water. When unpleasant odors or itching force you to leave the area, you, or whoever goes back to investigate, should be sure to wear proper protective equipment.
Stop exposure to pesticide immediately.
If someone gets sick from pesticide poisoning, do the following:
If breathing has stopped, start artificial respiration.
Call a doctor immediately and get the patient to him as soon as possible.
Have the patient wash thoroughly with plenty of clean water and soap.
If a pesticide has been swallowed, check the label. If the label specifies having the patient vomit, do it, following the instructions the manufacturer supplies. If the swallowed material contains kerosene or another hydrocarbon solvent (check the container), don't have him vomit, but inform the doctor. In any case, do as the label indicates.
If pesticide gets into the worker's eyes, rinse them thoroughly with clean water for at least 15 minutes and then have them checked by a doctor.
If you know this information thoroughly, there is no reason why you have to be afraid of working with pesticides. The pesticide industry is an important one and you can work with pride and a sense of security when you know how to take care of yourself on the job.

NOW... READ THIS MANUAL AGAIN

APPENDIX A

WHAT IS A PESTICIDE ?

It is easy to recognize a pesticide when somebody calls it a weed-killer or a rat poison, but you should be familiar with the scientific names too. Here are the most common technical or scientific names used for pesticides:

Pest	Scientific name	
Insects, bugs	Insecticide	
Weeds, grasses trees, etc.	Herbicide	
Rats, mice, gophers, etc.	Rodenticide	
Mold, fungus, rot, blight	Fungicide	
Snails, slugs	Molluscicide	
Eelworms, nematodes, plant-eating soil worms	Nematicide, Nematocide, or Nemacide	

These are only the main groups. Under these, there are about 125 major pesticides and these are mixed by formulators to make about 8000 different products.

Classification of some common pesticides

Insecticides		
Abate*	Dursban*	Mevinphos
Banvel*	Fenthion	Parathion
Barban	Dasanit*	Phorate
Carbaryl	DDT	Phosvel*
Carbon tetrachloride	Guthion*	Ronnel
Diazinon*	Lindane	Rotenone
Dichlorvos	Malathion	Ruelene*
Dimethoate	Meta-Systox R*	Systox*
Disulfoton	Methomyl	TEPP
	Methyl Parathion	Toxaphene

Herbicides			
AAtrex*	Diquat	Paraquat	Sutan*
Benefin	DSMA	Picloram	2,4,5-T
2,4-D	Eptam*	Probe*	TCA
Dalapon	Lasso*	Ramrod*	Vernam*
Dinitro	MSMA	Silvex	

Rodenticides		
Antu	Fumarin*	MGK* Rodenticide
Diphacin*	Gophacide*	Warfarin

Molluscicides		
Bayluscide*	Brestan*	Matacil*

Fungicides			
Bennomyl	Chloropicrin	Thiram	Ziram
Captan	Maneb	Zineb	

Nematocides		
EDB	Methyl Bromide	Nemacur*
DBCP	Nellite*	Vapam*

* *Proprietary names*

NIOSH AND OSHA REGIONAL OFFICES

The following pages list NIOSH and OSHA regional offices. Either of these facilities serving the state can provide information on the OCCUPATIONAL SAFETY AND HEALTH ACT including questions on standards interpretations, voluntary compliance information, copies of the *OSHA Standards, OSHA Act, Employee Rights Posting Notice* and other OSHA publications.

NIOSH REGIONAL OFFICES

DHEW, Region I
Government Center (JFK Fed. Bldg.)
Boston, Massachusetts 02203
Tel.: 617/223-5807

DHEW, Region II—Federal Building
26 Federal Plaza
New York, New York 10007
Tel.: 212/264-2485/8

DHEW, Region III
3525 Market Street P.O. Box 13761
Philadelphia, Pennsylvania 19101
Tel.: 215/597-6716

DHEW, Region IV
50 Seventh Street, N.E.
Atlanta, Georgia 30323
Tel.: 404/626-5474

DHEW, Region V
300 South Wacker Drive
Chicago, Illinois 60607
Tel.: 312/353-1710

DHEW, Region VI
1114 Commerce Street (Rm. 8-C-53)
Dallas, Texas 75202
Tel.: 241/792-2261

DHEW, Region VII
601 East 12th Street
Kansas City, Missouri 64106
Tel.: 816/374-5332

DHEW, Region VIII
19th & Stout Streets
9017 Federal Building
Denver, Colorado 80202
Tel.: 303/837-3979

DHEW, Region IX
50 Fulton Street (254 FOB)
San Francisco, California 94012
Tel.: 415/666-3781

DHEW, Region X
1321 Second Avenue (Arcade Bldg.)
Seattle, Washington 98101
Tel.: 206/442-0530

OSHA REGIONAL OFFICES

Region I
U.S. Department of Labor
Occupational Safety and Health Administration
18 Oliver Street, Fifth Floor
Boston, Massachusetts 02110 . . . . . Telephone: 617/223-6712/3

Region II
U.S. Department of Labor
Occupational Safety and Health Administration
1515 Broadway (1 Astor Plaza)
New York, New York 10036 . . . . . Telephone: 212/972-5941/2

Region III
U.S. Department of Labor
Occupational Safety and Health Administration
15220 Gateway Center, 3535 Market Street
Philadelphia, Pennsylvania 19104 . . . . . .Telephone: 215/596-1201

Region IV
U.S. Department of Labor
Occupational Safety and Health Administration
1375 Peachtree Street, N.E., Suite 587
Atlanta, Georgia 30309. . . . . Telephone: 404/526-3573/4 or 2281/2

Region V
U.S. Department of Labor
Occupational Safety and Health Administration
300 South Wacker Drive, Room 1201
Chicago, Illinois 60606 . . . . . Telephone: 312/353-4716/7

Region VI
U.S. Department of Labor
Occupational Safety and Health Administration
7th Floor, Texaco Building, 1512 Commerce Street
Dallas, Texas 75210. . . . . Telephone: 214/794-2477/8/9 or 2567

Region VII
U.S. Department of Labor
Occupational Safety and Health Administration
Federal Building, Room 3000, 911 Walnut Street
Kansas City, Missouri 64106 . . . . . Telephone: 816/374-5861

Region VIII
U.S. Department of Labor
Occupational Safety and Health Administration
Federal Building, Room 15010, 1961 Stout Street
Denver, Colorado 80202 . . . . . Telephone: 303/837-3883

Region IX
U.S. Department of Labor
Occupational Safety and Health Administration
9470 Federal Building, 450 Golden Gate Avenue
Post Office Box 36017
San Francisco, California 94102 . . . . . .Telephone: 415/556-0584

Region X
U.S. Department of Labor
Occupational Safety and Health Administration
1808 Smith Tower Building, 506 Second Avenue
Seattle, Washington 98104 . . . . . Telephone: 206/442-5930

EMERGENCY INFORMATION

FIRE

Telephone Fire Department _____

Nearest Alarm Box at _____

CRIME

Telephone Police _____

INJURY/ILLNESSES

Avoid infection of minor injuries; always get medical attention or skilled first aid.

Doctor _____

Office _____ Tel. _____

Residence _____ Tel. _____

_____

_____

Hospital _____

Address _____ Tel. _____

Ambulance _____

Address _____ Tel. _____

(In emergencies, get medical attention and transportation elsewhere if necessary.)

In all cases of Fire, Crime, Accident, or Sickness, promptly notify:

1. Name _____ Office Tel. _____

   Address _____ Res. Tel. _____

or

2. Name _____ Office Tel. _____

   Address _____ Res. Tel. _____

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