- Health Administration (608) 785-9872
- Environmental Health (608) 785-9771
- Health Education (608) 785-9872
- Laboratory (608) 785-9872
- Nursing (608) 785-9723
- Vector Control (608) 785-9872
- WIC/Nutrition Services (608) 785-9865
- TDD (608) 785-9787
- FAX (608) 785-9846

LA CROSSE COUNTY HEALTH DEPARTMENT

300 4th Street North • La Crosse, WI 54601-3228

Field Manual

La Crosse County Health Department

Vector Control

March 2005

Letterhead

AGENCY MEMBER OF THE

"To improve the quality of life and health of all people in La Crosse County."

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Chapter 1 Introduction

La Crosse County Health Department Mission Statement 1.1

The mission of the La Crosse County Health Department is to improve the quality of life and health of all people in La Crosse County.

La Crosse County Health Department Vision Statement. 1.11

Provide services that assist La Crosse County residents in realizing the opportunity to live a long and productive life, free of preventable disease and the effects of preventable injury. Be recognized as a catalyst working with individuals and public and private organizations to bring about positive changes of the health status of La Crosse County residents.

Introduction 1.2

In the mind of the public, mosquito control is a truck with a fogger driving through their neighborhood. This is nuisance mosquito control and is done to answer the question, "What are we paying these people to do anyway?" The public wants to grill steaks in the evening without being bitten by mosquitoes. The perception of what vector control does and the reality of what it does is different. The reality of the business is that it is a public health program working on disease control.

Area Diseases Overview 1.3

There are 24 identified species of mosquitoes in the Coulee Region; four are known disease carriers. These four species will all breed in tires and other water-holding containers. The specific diseases in the area that Vector works to control are La Crosse Strain Encephalitis (LAC), Eastern Equine Encephalitis (EEE), Western Equine Encephalitis (WEE), St Louis Encephalitis(SLE), and West Nile Virus (WNV). The department is also constantly monitoring for imported diseases and non-endemic mosquito diseases.

Since its inception in 1979, LCHD Vector Control has reduced the incidence of LAC from an average of 28 cases per year in its contract area to between five and six

Chapter 2 Personnel and Procedures

General 2.1

This manual is intended to provide a set of guidelines for Vector Control employees to conduct their daily business. These guidelines are not all-inclusive and therefore, may be added to at any time. These guidelines do not create any contract of employment. LCHD intends that its temporary summer help are hired on an at will basis. This manual is only designed to be a guide for vector employees in their daily activities.

Seasonal employment begins in mid-April when early tire survey work begins. It extends until the end of the mosquito-breeding season in late September or October.

Falsification of Records 2.2

The falsification or misrepresentation of your employment application, driving record or any other required information may result in immediate dismissal.
Falsification or misrepresentation of your time sheets may result in immediate dismissal.

Hours of Work 2.3

There are no sick days or insurance benefits provided with the job.
Unless otherwise specified, the workday starts at 8:30 a.m. You are expected to be at the daily meeting on time.

LCHD paychecks are issued biweekly.

Payroll sheets are filled out on Fridays. See figure 2.1 for points to note when filling out your time sheet.

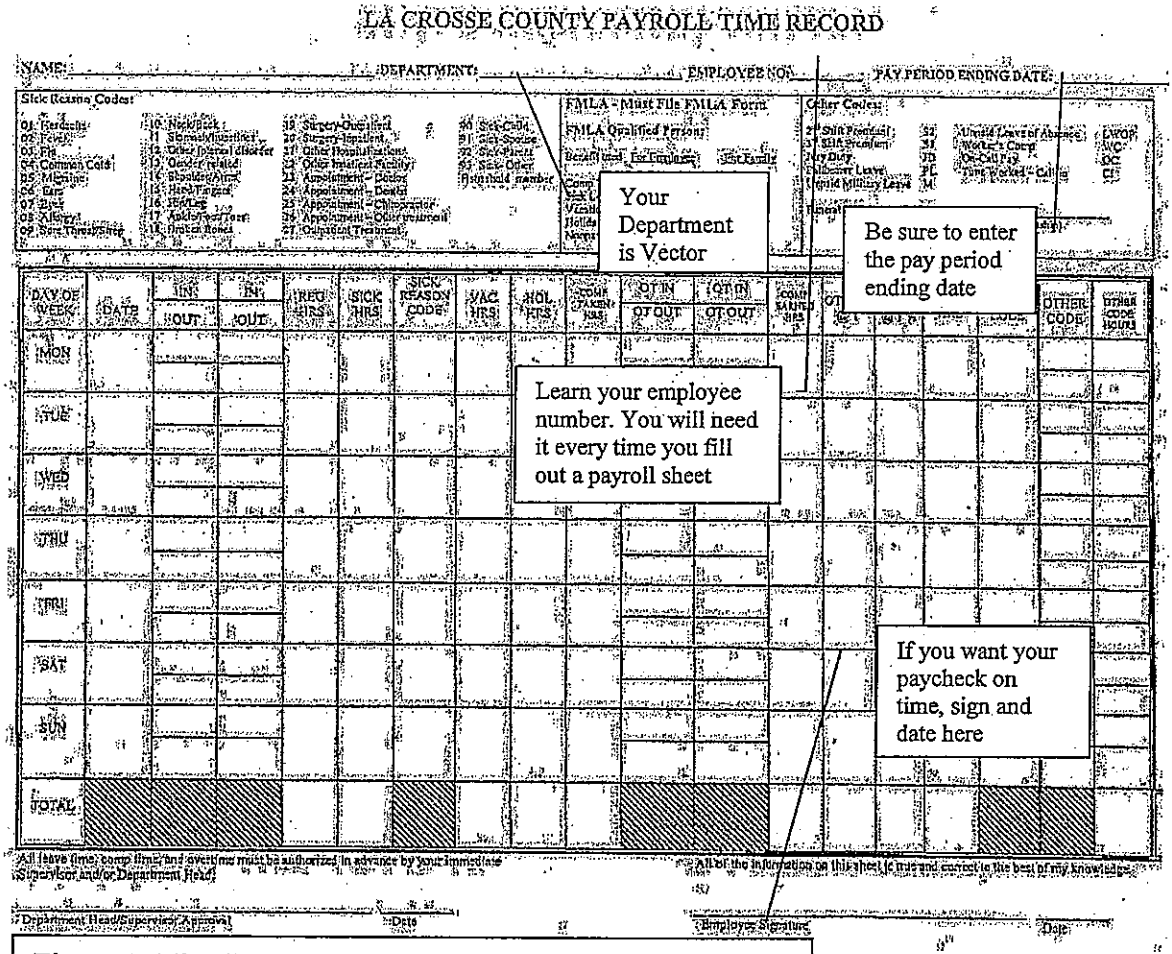


Figure 2.1 La Crosse County Payroll Sheet

Overtime 2.4

Seasonal employees are paid overtime at the rate of 1 1/2 times the normal rate of pay for all hours worked over 40 in a one-week period.

Clothing Requirements 2.5

Long pants and knee-high boots are recommended for aquatic habitat work. The department provides knee-high boots, hip boots and chest waders. When adulticiding, long pants and a long sleeved shirt are necessary and should be washed as soon as possible after completion of the job. The department recommends long sleeved shirts and long pants for areas where cow parsnip grows. Long pants also offer some protection from ticks, stinging nettles and poison ivy. The department also provides insect repellent.

You will be representing La Crosse County wherever you are working. Clothes with inappropriate graphics or logos are not allowed.

Discipline and Dismissal 2.6

Discipline and dismissal procedures are covered under LCHD employment rules and will not be covered in this manual.

Fueling County Owned Vehicles 2.7

County owned vehicles, trucks and squad cars, are to be refueled at the Kwik Trip at 3130 State Road. A county credit card is on file at the counter for county vehicles only. **Save your receipt and turn it in to a supervisor at the garage.** The manager will turn these in to the health department accounting staff.

Any attempt to fuel your own car or truck on a county credit card will result in immediate dismissal.

When using your own vehicle, the county will pay you mileage according to the rate set by the county board every year. Enter your mileage in your daily log then transfer the information to a county mileage sheet at the end of the month.

Petty Cash Reimbursement 2.8

The county will refund small item purchases made with your own money. Turn your receipt in to one of the health department secretaries.

HIPAA 2.9

HIPAA is the Health Insurance Portability and Accountability Act; it is a federal law. All La Crosse County employees are required to review the La Crosse County Confidentiality Policy. You can do this by going to the office, going to the County View web site and clicking the HIPAA button. There is a PowerPoint presentation on your responsibilities under HIPAA.

In short, as a Crosse County Health Department employee, you cannot reveal any information about any disease case you know anything about. Keep this in mind when you are doing case site follow up studies.

Chapter 3 Dealing with the Public

Interacting with the Public 3.1

As an employee of LCHD Vector Control, you will meet the public. Whether it is while you are spraying larvicide in the marsh, on tire survey work, or answering a complaint, you must remember that you represent the county to the public.

If a citizen approaches you with a question, be polite and answer the question to the best of your knowledge. If you cannot answer the question or the citizen is angry, refer them to the Health Department and give them the LCHD number.

If you are approached by the media, refer them to LCHD and a formal interview appointment will be made.

Dealing with Property Rights 3.2

If a tire site or other habitat is located on posted property, you have the right to go to the owner's door to contact them.

Treatment of potential health hazards on non-posted property is permitted under Wisconsin Public Health Laws unless specifically prohibited by the owner. If an owner denies access, politely leave and report the situation to your supervisor

Chapter 4 Mosquito Habitat and Biology

Breeding Habitat-Natural 4.1

Just about anywhere that will hold water for a week can be considered mosquito habitat. In the La Crosse marsh, drainage ditches and tire ruts have to be watched closely. One area to check after rains is the soccer fields on the north side of town. Water collects in the low spots in the mowed areas and behind the dike where excess water is pumped.

The department has mapped most natural breeding sites in La Crosse County. Vector Control divided the county into four areas. Refer to the large black ring binder issued to you to find out what the boundaries of these areas are. On these maps are the areas known to breed mosquitoes. Watch construction sites; these sites will often hold water long enough for mosquitoes to breed but will never show up on a map.

LCHD Vector also monitors woodland floodplain areas. An example of these would be at the end of Walnut Street on French Island or the area next to the Ace Hardware Warehouse.

Ochlerotatus triseriatus, the carrier of La Crosse encephalitis, naturally breeds in tree holes and stumps that are rotting out. Use gypsum to fill these holes rather than cement because a chainsaw will cut through gypsum without damage to the saw.

Breeding Habitat-Artificial 4.2

The most common artificial habitat in the La Crosse area is discarded tires. These tires are ideal breeding sites; they hold water for a long time and are warm. The temperature differences over tree holes can speed up the egg and larval development phase from 21 days to as little as 7 days. While tires make the ideal habitat, just about any container holding water can breed mosquitoes. Larvae have been found in teakettles, decorative whiskey barrels, abandoned sinks, parked boats and on the floors of junked cars. One soda can left upright, on the edge of a parking lot, had nearly 200 larvae in it.

When found, treat the tires, attempt to contact the owners, remove them if necessary, record the location, and speak to the homeowners to educate them as to the risk. The department will remove tires at cost. If you are involved in tire removal, issue a receipt for the tires removed and money you collected.

Generalized Mosquito Life Cycle 4.3

Eggs

Mosquitoes must spend their larval stage in water. After taking a blood meal, an adult female will search for a place to lay her eggs. Most nuisance mosquitoes lay their eggs on moist soil close to the waterline. The eggs will lie dormant for up to five years until flooded, at which point they will hatch. *Aedes/Ochlerotatus* females lay their eggs singly in tree holes or other containers. *Culex* females lay their eggs in clusters or rafts.

Larva

Larvae usually prefer water less than a foot deep. Since a larva's breathing siphon is in its tail, they can be seen floating head down at the surface. When not getting air they are very active. Larvae are called wrigglers because they swim by snapping the rear half of their body from side to side.

When larvae first hatch, they are less than 1/8 inch long and almost transparent. The larvae develop through four stages called instars. In the fourth instar, the larvae are about 3/8 inch long.

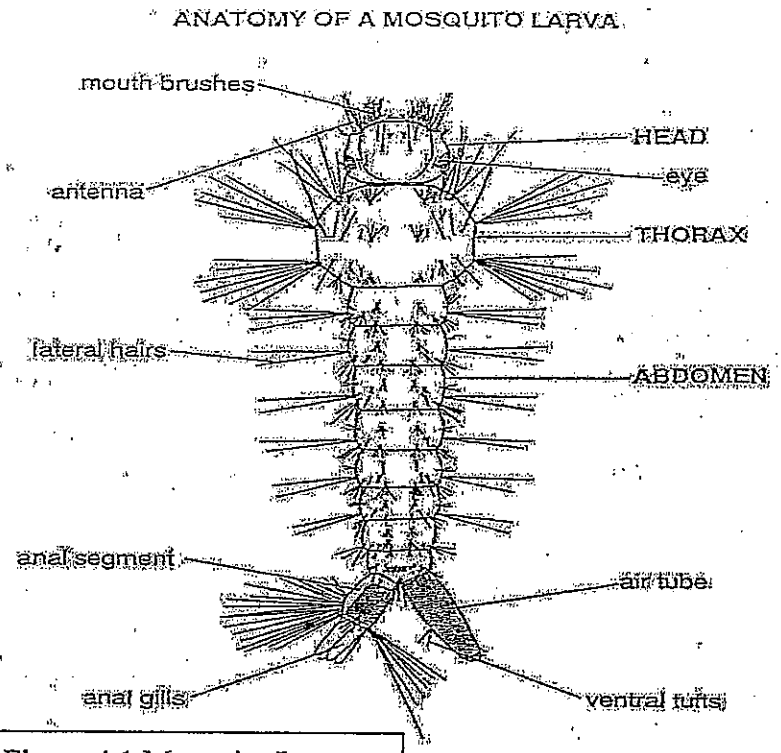


Figure 4.1 Mosquito Larva

Pupa

After the fourth larval instar, the larva molts into a pupa. The pupa is a cocoon-like stage. Pupae are called tumblers because of the way they move through the water when they are disturbed. Pupae do not feed so larvicides are ineffective at this stage. Also, if you find a tire with no active larvae in it, look closely for empty pupa skins.

Adult

The adult will form inside the pupa after about two days. The adult then breaks out of the pupa skin. It will rest for a while on the surface of the water while its wings dry. The males will emerge first and form a mating swarm as the females emerge. A female will only mate once in her life, storing the sperm in her body to fertilize the eggs as she lays them. The female will then fly off in search of a blood meal. The females need the protein in the blood to develop the eggs. The primary time for *Culex* blood feeding is between sunset and sunrise. *Oc. triseriatus* prefers late afternoon to early evening. Males do not take a blood meal, feeding only on plant nectar. See Figure 4.2

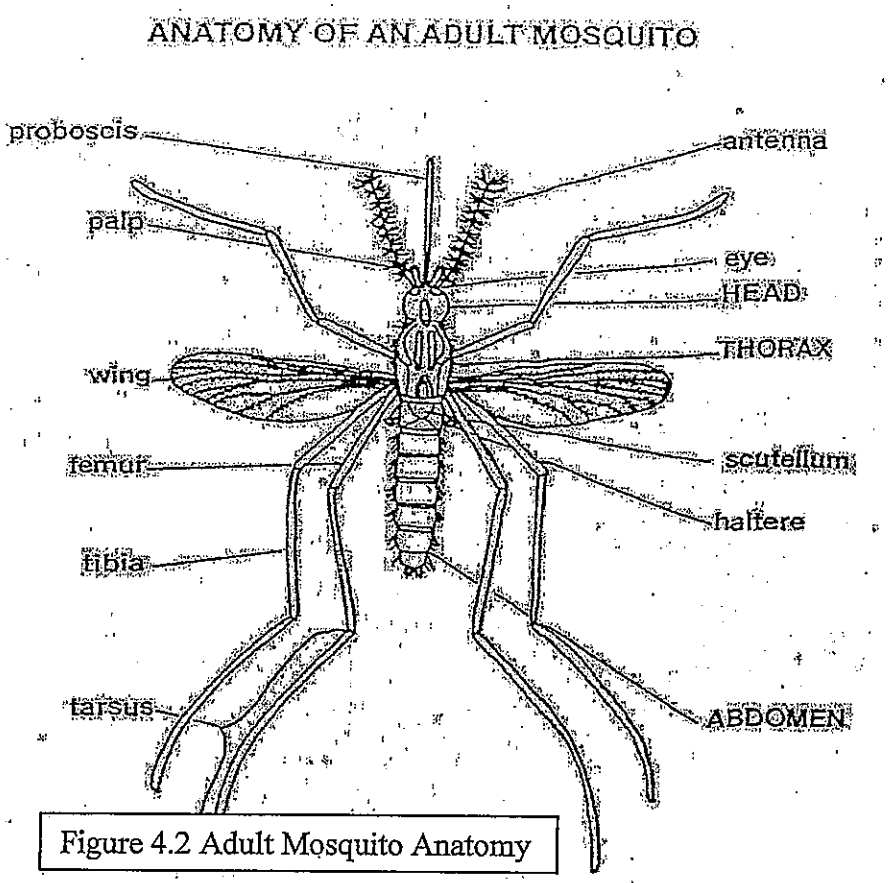


Figure 4.2 Adult Mosquito Anatomy

Area Species 4.6

Aedes vexans

There are 53 identified species of mosquitoes in Wisconsin; 24 are known to make their home in the La Crosse area. According to Phillip Pellitteri, a University of Wisconsin entomologist, more than 80% of the mosquito bites in Wisconsin are from *Aedes vexans.* This species is a strong flyer, know to fly high and ride winds for up to 40 miles.

Coquillettidia perturbans

Another widely known mosquito is *Coquillettidia perturbans,* the cattail mosquito; sometimes called a gallinipper, will reach ½" in size. Cattail mosquito larvae have a unique breathing apparatus that allows them to penetrate the root of the cattail and draw its air from inside the cattail. *Cq. perturbans* develops in permanent pools of water, as opposed to floodwater species, that prefer temporary pools of water.

Aedes cinereus

This species is not a strong flyer and is considered a summer species. Because it prefers to bite below the knee, its common name is ankle-biter.

Medically Important Species

Ochlerotatus triseriatus

Oc. triseriatus is the most medically important species in the La Crosse area. Known as the tree-hole mosquito, it is the vector for La Crosse encephalitis (LAC). This disease was first isolated in La Crosse in 1963. Work on vector control has been ongoing in La Crosse since 1979. Strictly a container breeder, *Oc. triseriatus* is a weak flyer, staying within a several hundred-yard radius of its breeding area. Females lay their eggs singly along the waterline of a container where the next rainfall will cover them. Eggs remain viable for a long time. In one experiment using stored tires, eggs were still viable after eight years.

Culex pipiens, Culex tarsalis, Culex restuans

The three *Culex* species native to the La Crosse area are all known WNV vectors. *Culex tarsalis* is also the vector for Western Equine Encephalitis (WEE).

The females lay their eggs in rafts and the larvae congregate in dense rafts. These rafts can be anywhere from 6 inches in diameter to 6 feet in diameter. At a density of four larvae per cubic centimeter, a standard 20-ounce soda bottle would have about 2400 larvae in it. *C. pipiens and restuans* prefer shallow shaded water, where *C. tarsalis* prefers shallow water exposed to the sun. *Culex* species go into diapause, a hibernation-like state, and overwinter as adults. *C. pipiens* is the most numerous but *C. tarsalis* is the most important.

They are typically avian feeders, but as the mosquito population rises at the end of summer, the supply of females needing a blood meal outstrips the supply of birds. The females will then turn to targets of opportunity-humans and other mammals.

Aedes albopictus

A. albopictus is a nonnative species from Asia it earned the name Asian tiger mosquito because of its aggressive feeding habits. It arrived in the United States in the 1980's on tires exchanged for retreading. Several Malaysian species established themselves in the southern U.S. where they are displacing native *Aedes* species. A species from northern Japan, capable of diapause, has established itself in the Chicago metro area. *A. albopictus* has been found in the metro Minneapolis area but it has not established itself there. The Asian tiger mosquito is

often referred to as a viral sponge because of its capacity to be a competent vector for almost any viral disease

Chapter 5 Control Chemicals

Laws on Chemical Use 5.1

The chemicals the department uses fall under both the Department of Agriculture rules for use and the Department of Natural Resources rules for use.

When spraying Anvil, you must always carry a DNR applicator's permit in the truck.

Public Concerns 5.2

Residents of the LCHD service area are often concerned with the environment and the possible health risks from the chemicals you are using. People raised in the 1960's remember the mosquito fogging trucks going through their town, followed a few days later by waves of dying songbirds. Those chemicals are no longer used. It is your responsibility, as a chemical applicator, to be knowledgeable about the chemicals you use and to be able to communicate that knowledge to the public. Much of the information you need to know is on the container label and on the Material Safety Data Sheets (MSDS) on file for every chemical LCHD uses. If you do not know the answer to the question, refer them to the department.

Labeling 5.3

The labeling section is courtesy of the Metropolitan Mosquito Control District.

Throughout this manual, you will be advised to "read the label" and "follow directions on the label" That is because so much important information on pesticide use on the label.

The information and directives of the product label are the direct result of years of scientific research. Each new product must undergo and pass rigorous testing and environmental evaluations to qualify to receive an EPA-approved label.

These tests include:

- Toxicological tests-to determine possible health hazards to humans and animals
- Metabolism studies-to see how long it takes a compound to break down into simple, less toxic materials.
- Residue tests-to find out how much of the pesticide or its breakdown products remain on farm products, including crops, meat, milk, and eggs.
- Soil movement tests- to determine how long a pesticide remains in the soil and how it moves in the soil and groundwater.

- Wildlife tests-to determine the immediate and long-term effects on wildlife.
    - Performance tests-to prove that the pesticide controls the pest and improves the quality and quantity of the crop

EPA scientists and regulatory officials review the test results and determine whether to approve the pesticide and its respective label. Once it is approved the pesticide is registered. Information on the label and all supplementary labeling must not differ from the information given to the EPA when the product was registered. The label is the information printed on or attached to the pesticide container or wrapper; labeling refers to the label plus all additional product information, such as brochures and flyers, provided by the manufacturer or dealer. Both the label and supplementary labeling are legally binding documents and must be followed exactly. It is illegal to use any registered pesticide in a manner inconsistent with its labeling. It should also be noted that you must use the current label. Labels often change from year to year.

State Labels

Some states have supplemental labels (e.g. special, local needs and emergency labels) that have additional directives or restrictions. Most additional state label requirements (e.g. California, Florida) are included on the original product label. If your state has additional label restrictions, these directives will take precedence over the other label statements. These labels should be available at the time of application.

Information on the pesticide Label

The pesticide label has several different parts including:

Pesticide Name:

Pesticides go by several names. Here are the different types of names a pesticide may have.
Brand, trade, or product name: Registered by a company for a specific pesticide formulation. Companies use the same name with minor variations to designate entirely different formulations. For example: Altosid® XR, Extended Residual Briquettes, Altosid® Liquid Larvicide.
Common name: The name of the active ingredient in a pesticide. The name is approved and formally adopted by official agencies and societies. For example, Methoprene is the common name for the brand Altosid®, and Bti is the common name for VectoBac® products.
Chemical name: The chemical parts and structure of the active ingredient. The chemical name is usually listed following the common name. For example, on the Altosid® XR briquette label, the common name for the active ingredient, (S)Methoprene is followed by [Isopropyl(2E,4E,7S)-113,7,11-trimethyl-2,4dodecadieneate] which is the chemical name.

Type of Pesticide:

The type of pesticide is usually listed on the front of the label. It tells you in general terms what the product will control. Examples: "Mosquitoes," "Insecticide for control of certain insects on fruits, nuts or ornamentals," "Herbicide for control of trees, brush, and weeds."

Formulation:

Pesticides come in many formulations. Sometimes the same pesticide is available in different formulations, for example, as a granule or as an emulsifiable concentrate. The instructions on the label are solely for the formulation in the container to which the label is attached.

Classification:

If the pesticide has restricted uses, the restricted –use statement will be at the top of the front panel of the label. Restricted use pesticides require that an applicator receive specific training and appropriate licensing.

Ingredient Statement:

The ingredient statement lists both the active and inert ingredients, usually as percentages of the total formulations. The active ingredient is the chemical that does the job. The inert ingredients are the non-active ingredients added to the formulation (i.e. carriers, wetting agents, diluting substances, etc.).

Net Contents:

The net contents show the amount of the formulation in the containers. It may be listed by weight, as pounds or ounces; or by volume, in pints or gallons.

Directions for Use:

This part contains both general and specific information. The general statement usually gives the following information:

- The crops, livestock, or sites to be treated.
- The pests to be controlled-if any unlisted pest is found on the site, it may also be treated, but only if the application is to a crop, animal, or site which the label allows.
- Method of application-for example, the amount to use per treatment
- Time-for example, the interval between treatment and harvest
- Geography-for example, certain states or regions listed on emergency labels (special local need labels).
- Wildlife-for example, protection of endangered species

- Incompatibilities with other pesticides
- How to mix and apply-what equipment to use, whether to agitate, whether to mix the pesticide with oil or water, when and where the material should be applied, how to incorporate it into the soil, the type of spray pattern, and other how-to-do-it information.

Note: It is illegal to apply any pesticide to crops, livestock, or sites not specified on the label.

Specific information includes:

- How much to use-this tells you the application rate-the weight or volume per acre or thousand feet of row, or the amount to mix in a given volume of water. It also tells you if there is a limit on the number of treatments that can be given; this may appear in a separate limitations section on the label.
- Method of application-this tells you whether to use broadcast, band, furrow, foliage or other type of application.
- When to apply-this tells you when to apply a pesticide-before or after planting, at a certain stage of plant development, during a dormant period, etc.

Warnings and Precautions:

This part of the label contains important safety information. It includes signal words and statements to warn you about dangers for humans and domestic animals. In some cases, the label may not contain certain warnings, but the absence of warning does not rule out the need for safety precaution. All pesticide labels must include the statement: KEEP OUT OF REACH OF CHILDREN. Listed below are other important safety warnings on pesticide labels.

Signal Words:

Certain signal words are used to indicate how dangerous the pesticide is to humans. These words are:

DANGER The product is highly hazardous and a very small amount could be fatal. For the most toxic pesticides, the DANGER precaution will also have a drawing of a skull and crossbones and the word "poison" printed in red.

WARNING The product is moderately hazardous.

CAUTION The product is slightly hazardous

Route of Entry:

This part comes right after the signal words. It tells you which route of entry (mouth, skin, lungs) you must take special care to protect. Many pesticides are hazardous by more than one route, so study this part of the label carefully. For example, one or all of the following statements may follow a DANGER signal:

- Fatal if swallowed
- Poisonous if inhaled
- Extremely hazardous by skin contact-rapidly absorbed through skin
- Corrosive-causes eye damage and severe skin burns

The signal word of a pesticide is based on the most toxic route of entry or if it is a skin or eye corrosive.

Specific Action Statements:

Specific action statements come right after the route of entry statement. This part of the label tells you what to do to prevent poisoning accidents, example, "Do not breathe vapors or mist."

Protective Clothing and Equipment:

Some labels fully describe the protective clothing and equipment you should use when handling the pesticide. Other labels may list recommendations or provide no protective clothing statements at all. If the label has a statement, be sure to follow the advice given. If the label does not have a protective statement, use common sense and reduce your exposure to any chemical as much as possible by using the standard safety equipment provided by the department (e.g. goggles, gloves, dust masks, and long sleeved shirts). Also check the signal word, the route of entry, and hazard statements to decide if you need more protection than is listed. You can also refer to the MSDS (Material Safety Data Sheets) on file at the garage.

Safe Handling:

Labels often list precautions for safe handling, for example, "Do not contaminate food or feed" or "Wash thoroughly after handling and before eating and smoking." Applicators should always take care to handle all pesticides safely even if there are no warnings on the label.

First Aid:

This part contains advice in case of poisoning, for example, "If swallowed, drink large quantities of milk, egg white or water-do not induce vomiting." All DANGER labels contain a note to physicians describing the medical treatment for poisoning emergencies. Some Warning and Caution labels may also have this information.

Environmental Hazards:

This tells you if the pesticide is hazardous to fish, wildlife, birds or other non-target organisms. For example, "This product is highly toxic to bees." Also, there are many warnings on how to avoid contaminating the environment, for example, "Do not apply when runoff is likely to occur" or "Do not allow drift on desirable plants or trees." If these statements do not appear, you should still take proper precautions and use your best judgment.

Physical or Chemical Hazards:

This section informs you of any special fire, explosion, or chemical hazards. Example: "Flammable-do not use, pour, spill, or store near heat or open flame."

Control Materials:

This information and the information about environmental hazards might not be located in the same place on all pesticide labels. Be sure to search the label for these statements before you handle the pesticide.

Re-entry Interval:

This is the length of time that must pass before a person can enter the treated area without protective clothing. The re-entry interval varies according to the pesticide. The label also states whether the treatment area must be posted to inform people about re-entry limitations. Minnesota regulations require posting if a re-entry label is listed on the label. Various communities may have additional posting requirements so ask you supervisor about any special requirements, concerns, or restrictions in your area.

Pre-harvest Interval:

This is the length of time that must pass between pesticide application and harvest. Mosquito control materials should not be applied to crops, gardens, or other edible plants.

Storage and Disposal:

This part explains how to store the pesticide, how to clean the equipment, and how to dispose of unused products.

Registration and Establishment Numbers

All pesticides must list the EPA registration number. This registration number verifies that the label has been approved by the EPA for use. In addition, the establishment number indicates the specific manufacturing plant where the pesticide was produced. The name and address of the manufacturer are also listed.

Read the label prior to using the product and review it prior to each subsequent use. It is important that you read and understand all the information on the label.

Larvicides 5.4

Larvicides are control chemicals used by LCHD Vector Control to control mosquitoes in their larval stages. The following is background information on the three larvicides used by La Crosse County Vector Control.

Abate 5% (Temephos)

LCHD adopted the use of Abate for use in tires where there would be a high probability of only one treatment per season. While it lasts for the entire season, it costs four times as much as VectoLex (*Bti*). Abate, manufactured by American Cyanamid, is a second-generation organophosphate; it works as a cholinesterase inhibitor. It has very low toxicity. Because LCHD uses the 5% granular form, it is almost identical to VectoLex in appearance. Because of this, see the note below.

Note: It is very important that any transfer container be clearly labeled as to its contents!

Altocid® (Methoprene)

LCHD uses Altosid® in three forms: 150-Day XR Briquettes, 30-Day Tablets, and 30-Day Granular form. It is used for artificial and natural habitat for long-term treatment. Before the department started using Abate, field workers used it on location to treat residential tires.

Methoprene is an Insect Growth Regulator (IGR). IGRs can be used for pest control as in the case of mosquitoes or to enhance production as in the case of silkworms. Mosquito larvae have a specific hormone for larval development. Methoprene, in doses of 1-2 parts per billion, mimics this hormone and biologically confuses the mosquito, not allowing it to molt into an adult.

VectoLex (Bacillus sphaericus)

Although LCHD's biological larvicide will be referred to as *Bti*, it isn't. *Bti* is *Bacillus thuringiensis israeliensis*, product name, VectoBac. The department uses VectoxLex, *Bacillus sphaericus*. This bacterium is also target specific, causing gut damage only to

mosquito larvae, black fly larvae and some midges. VectoLex does not affect other aquatic insects. This makes it an excellent treatment for natural and artificial habitat. Effective treatment life is 10-14 days.

Adulticides *5.5*

Anvil® (Sumithrin)

LCHD uses adulticides based on pyrethrum, a compound occurring naturally in chrysanthemum plants. Sumithrin is very safe; its use has been approved in restaurants. Sumithrin is a synthetic pyrethroid usually mixed with a light mineral oil and used in the Grizzly Ultra Low Volume sprayer mounted on the pickup truck. Application rates are 3-5 ounces per acre. Use it only when wind velocities are less than 5 mph and it is to be used at least 150 feet from water. A wind velocity gauge is stocked in the truck.

On the following pages are sample labels for the various chemicals the department uses.

CLARKE
ABATE 5% TIRE TREATMENT
insecticide

A GRANULAR INSECTICIDE FOR CONTROL OF Aedes albopictus (THE ASIAN TIGER MOSQUITO) AND OTHER CONTAINER BREEDING SPECIES

Active Ingredient:	
Temephos (O,O'-(thiodi-4,1-phenylene) O,O,O',O'-tetramethyl phosphorothioate)	5%
Inert Ingredients	95%
Total	100%

EPA REG No. 8329-30 EPA Est. No. 8329-IL-01

KEEP OUT OF REACH OF CHILDREN

DANGER/PELIGRO

See Below for Additional Precautionary Statements

PRECAUCION AL USUARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

STATEMENT OF PRACTICAL TREATMENT

If In Eyes: Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes.
If Swallowed: Drink promptly a large quantity of milk, egg white, gelatin solution, or if these are not available, large quantities of water. Avoid alcohol.

NOTE TO PHYSICIANS: This product may cause cholinesterase inhibition. Atropine is antidotal. Pralidoxime chloride (2-PAM; PROTOPAM chloride) may be effective as an adjunct to atropine.

PRECAUTIONARY STATEMENTS:
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER

Corrosive: Causes irreversible eye damage. Do not get in eyes or on clothing. Wear goggles. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

ENVIRONMENTAL HAZARDS

This product is toxic to birds and fish. Fish and other aquatic organisms in water treated with this product may be killed. You must consult your State Fish and Game Agency before applying this product to waters or wetlands. Do not contaminate water by cleaning of equipment or disposing of wastes.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

PROHIBITIONS: Do not contaminate water, food, or feed by storage or disposal.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

GENERAL: Consult Federal, state or local disposal authorities for approved alternative procedures.

THIS IS INTENDED TO CONTROL
Aedes albopictus (The Asian Tiger Mosquito) AND OTHER MOSQUITO LARVAE IN TIRE PILES AND OTHER ARTIFICIAL CONTAINERS SUCH AS DISCARDED CANS, HUB CAPS, AND FLOWER POTS.

TO CONTROL Aedes albopictus (THE ASIAN TIGER MOSQUITO) and other container breeding species, follow directions shown below for larval control in tires.

1. Apply to sides and tops of tire piles with power backpack blower from a High Ranger or similar elevating platform to aid in producing even distribution of granules.
2. Apply at a rate of one (1) pound of ABATE 5% Tire Treatment per 100 sq. ft. of tire pile surface area. Repeat application every thirty (30) days during the mosquito breeding season.
3. For individual tires and containers, place one full teaspoon in each receptacle. Repeat application every thirty (30) days.

DISCLAIMER

The label instructions for the use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable, and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use or application of the product contrary to label instructions, all of which are beyond the control of Clarke Mosquito Control Products, Inc. All such risks shall be assumed by the user.

Clarke Mosquito Control Products, Inc. warrants only that the material contained herein conforms to the chemical description on the label and is reasonably fit for the uses therein described when used in accordance with the directions for use subject to the risks referred to above.

Any damages arising from a breach of this warranty shall be limited to direct damages and shall not include consequential commercial damages such as loss of profits or values or any other special or indirect damages.

Clarke Mosquito Control Products, Inc. makes no other express or implied warranty, including any other express or implied warranty of FITNESS or of MERCHANTABILITY.

IN CASE OF EMERGENCY CALL INFOTRAC 1-800-535-5053

*Registered trademark of American Cyanamid Company

Net Contents:

CLARKE MOSQUITO CONTROL PRODUCTS, INC.
159 N. GARDEN AVENUE • ROSELLE, ILLINOIS 60172

Altosid® XR
EXTENDED RESIDUAL BRIQUETS

A SUSTAINED RELEASE PRODUCT TO PREVENT ADULT MOSQUITO EMERGENCE

SPECIMEN LABEL

ACTIVE INGREDIENT:	
(S)-Methoprene (CAS #65733-16-6)	
(Dry Weight Basis)	2.1%
OTHER INGREDIENTS:	97.9%
Total	100.0%

This product contains water; therefore the weight of the briquet and percent by weight of active ingredient will vary with hydration. The ingredient statement is expressed on a dry weight basis.

EPA Reg No. 2724-421

KEEP OUT OF REACH OF CHILDREN

CAUTION

INTRODUCTION

ALTOSID® XR BRIQUETS are designed to release effective levels of methoprene insect growth regulator over a period up to 150 days in mosquito breeding sites. Release of methoprene insect growth regulator occurs by dissolution of the briquet. Soil mud and loose sediment can cover the briquets and inhibit normal dispersion of the active ingredient. The product may not be effective in those situations where the briquet can be removed from the site by flushing action.

ALTOSID XR BRIQUETS prevent the emergence of adult mosquitoes including: *Anopheles*, *Culex*, *Culiseta*, *Coquillettidia*, and *Mansonia* spp., as well as those of the floodwater mosquito complex (*Aedes* and *Psorophora* spp.) from treated water. Treated larvae continue to develop normally to the pupal stage where they die.

NOTE: Methoprene insect growth regulator has no effect on mosquitoes which have reached the pupal or adult stage prior to treatment.

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION
ENVIRONMENTAL HAZARDS

This product is toxic to aquatic dipteran. Using it in a manner other than that described by the label could result in harm to aquatic dipteran. Do not contaminate water when disposing of unsafe or equipment washwaters.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

APPLICATION TIME

Placement of ALTOSID XR BRIQUETS should be at or before the beginning of the mosquito season. ALTOSID XR BRIQUETS can be applied prior to flooding when sites are dry, or on snow and ice in breeding sites prior to spring thaw. Under normal conditions, one application should last the entire mosquito season, or up to 150 days, whichever is shorter. Alternate wetting and drying will not reduce their effectiveness.

APPLICATION RATES:

Aedes and *Psorophora* spp.: For control in non-(or low-) flow shallow depressions (<2 feet in depth), treat on the basis of surface area, placing 1 briquet per 200 ft². Briquets should be placed in the lowest areas of mosquito breeding sites to maintain continuous control as the site alternately floods and dries up.

Culex, *Culiseta*, and *Anopheles* spp.: Place one ALTOSID XR BRIQUET per 100 ft².

Coquillettidia and *Mansonia* spp.: For application to cattail marshes and water hyacinth beds. For control of these mosquitoes, place one briquet per 100 ft².

APPLICATION SITES AND RATES (CONT.)

Use lower rates when water is shallow, vegetation and/or pollution are minimal, and mosquito populations are low. Use higher rates when water is deep (>2 ft), vegetation and/or pollution are high, and mosquito populations are high.

APPLICATION METHODS

Apply ALTOSID Pellets up to 15 days prior to flooding, or at any stage of larval development after flooding or in permanent water sites. Fixed wing aircraft or helicopters equipped with granular spreaders capable of applying rates from 2.5 to 10.0 lb/acre may be used to apply ALTOSID Pellets. The pellets may also be applied using ground equipment which will achieve good even coverage of the above rates. ALTOSID Pellets may be applied to artificial containers, such as tires and catch basins, etc.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

STORAGE:
Store closed containers of ALTOSID Pellets in a cool dry place.

PESTICIDE DISPOSAL:
Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL:
Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

WARRANTY AND CONDITIONS OF SALE

Sales subject to warranty, express or implied, concerning the use and handling of this product other than indicated on the label. Buyer assumes all risks of use and handling of the material when such use and handling are contrary to label instructions.

Always read the label before using this product.

For information call 1-800-248-7763 or visit our web site: www.altosid.com.

Wellmark

Wellmark International
Bartlesville, Illinois U.S.A.

ZOECON

Zoecon, A Wellmark International Brand
ALTOSID® Pellets, ALTOSID® Liquid Growth Regulator and ZOECON® are registered trademarks of Wellmark International.

20-24-DOT

Made in the USA

©1999 WELLMARK

November, 1999
Bartlesville, IL

Altosid® Pellets
MOSQUITO GROWTH REGULATOR

A GRANULAR PRODUCT TO PREVENT ADULT MOSQUITO EMERGENCE

SPECIMEN LABEL

ACTIVE INGREDIENT:	
(S)-Methoprene [CAS #65733-16-6]	4.25%
OTHER INGREDIENTS:	95.75%
Total	100.00%

EPA Reg No. 2724-448

KEEP OUT OF REACH OF CHILDREN
CAUTION

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION
ENVIROMENTAL HAZARDS

This product is toxic to aquatic dipteran (mosquitoes) and chironomid (midge) larvae. Using it in a manner other than that described by the label could result in harm to aquatic dipteran. Do not contaminate water when disposing of rinsate or equipment washwaters.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

INTRODUCTION

ALTOSID® Pellets release ALTOSID® Insect Growth Regulator as they erode. The pellets prevent the emergence of adult standing water mosquitoes, including *Anopheles, Culex, Culiseta, Coquillettidia,* and *Mansonia* spp., as well as adults of the floodwater mosquitoes, such as *Aedes* and *Psorophora* spp. from treated sites.

GENERAL DIRECTIONS

ALTOSID Pellets release effective levels of ALTOSID Insect Growth Regulator for up to 30 days under typical environmental conditions. Treatment should be continued through the last brood of the season. Treated larvae continue to develop normally to the pupal stage where they die. NOTE: This insect growth regulator has no effect on mosquitoes which have reached the pupal or adult stage prior to treatment.

APPLICATION SITES AND RATES

MOSQUITO HABITAT	RATES (Lb/Acre)
Floodwater sites:	
Pastures, meadows, ricefields, freshwater swamps and marshes, salt and tidal marshes, cattail marshes, woodland pools, floodplains, tires, other artificial water-holding containers	2.5-5.0
Dredging spoil sites, waste treatment and settling ponds, ditches and other manmade depressions	5.0-10.0
Permanent water sites:	
Ornamental ponds and fountains, fish ponds, cattail marshes, water hyacinth beds, flooded crypts, transformer vaults, abandoned swimming pools, construction and other manmade depressions, treeholes, other artificial water-holding containers	2.5-5.0
Storm drains, catch basins, roadside ditches, cesspools, septic tanks, waste settling ponds, vegetation-choked phosphate pits	5.0-10.0

Culex sp. in storm water drainage areas, sewers, and catch basins: For catch basins, place 1 briquet into each basin. In cases of large catch basins, follow the chart below to determine the number of briquets to use. For storm water drainage areas, place 1 briquet per 100 feet square of surface area up to 2 ft deep. In areas that are deeper than 2 feet, use 1 additional briquet per 2 feet of water depth.

Large water flows may increase the dissolution of the briquet thus reducing the residual life of the briquet. Regular inspections (visual or biological) in areas of heavy water flow may be necessary to determine if the briquet is still present. The retreatment interval may be adjusted based on the results of an inspection.

Number of Briquets	Catch Basin Size (Gallons)	Surface Area/ Water Depth (ft)
1	0 – 1500	0 – 2
2	1500 – 3000	2 – 4
3	3000 – 4500	4 – 6
4	4500 – 6000	6 – 8

APPLICATION SITES

ALTOSID XR BRIQUETS are designed to control mosquitoes in treated areas. Examples of application sites are: storm drains, catch basins, roadside ditches, fish ponds, ornamental ponds and fountains, other artificial water-holding containers, cesspools and septic tanks, waste treatment and settling ponds, flooded crypts, transformer vaults, abandoned swimming pools, tires, construction and other manmade depressions, cattail marshes, water hyacinth beds, vegetation-choked phosphate pits, pastures, meadows, rice fields, freshwater swamps and marshes, salt and tidal marshes, treeholes, woodland pools, floodplains, and dredging spoil sites. For application sites connected by a water system, i.e., storm drains or catch basins, all of the water-holding sites in the system should be treated to maximize the efficiency of the treatment program.

STORAGE AND DISPOSAL

STORAGE

Store in a cool place. Do not contaminate water, food or feed by storage or disposal. Do not reuse empty container.

DISPOSAL

Dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

WARRANTY AND CONDITIONS OF SALE

Seller makes no warranty, express or implied, concerning the use and handling of this product other than indicated on the label. Buyer assumes all risks of use and handling of this material when such use and handling are contrary to label instructions.

For information, or in case of an emergency, call 1-800-248-7763 or visit our Web site: www.altosid.com

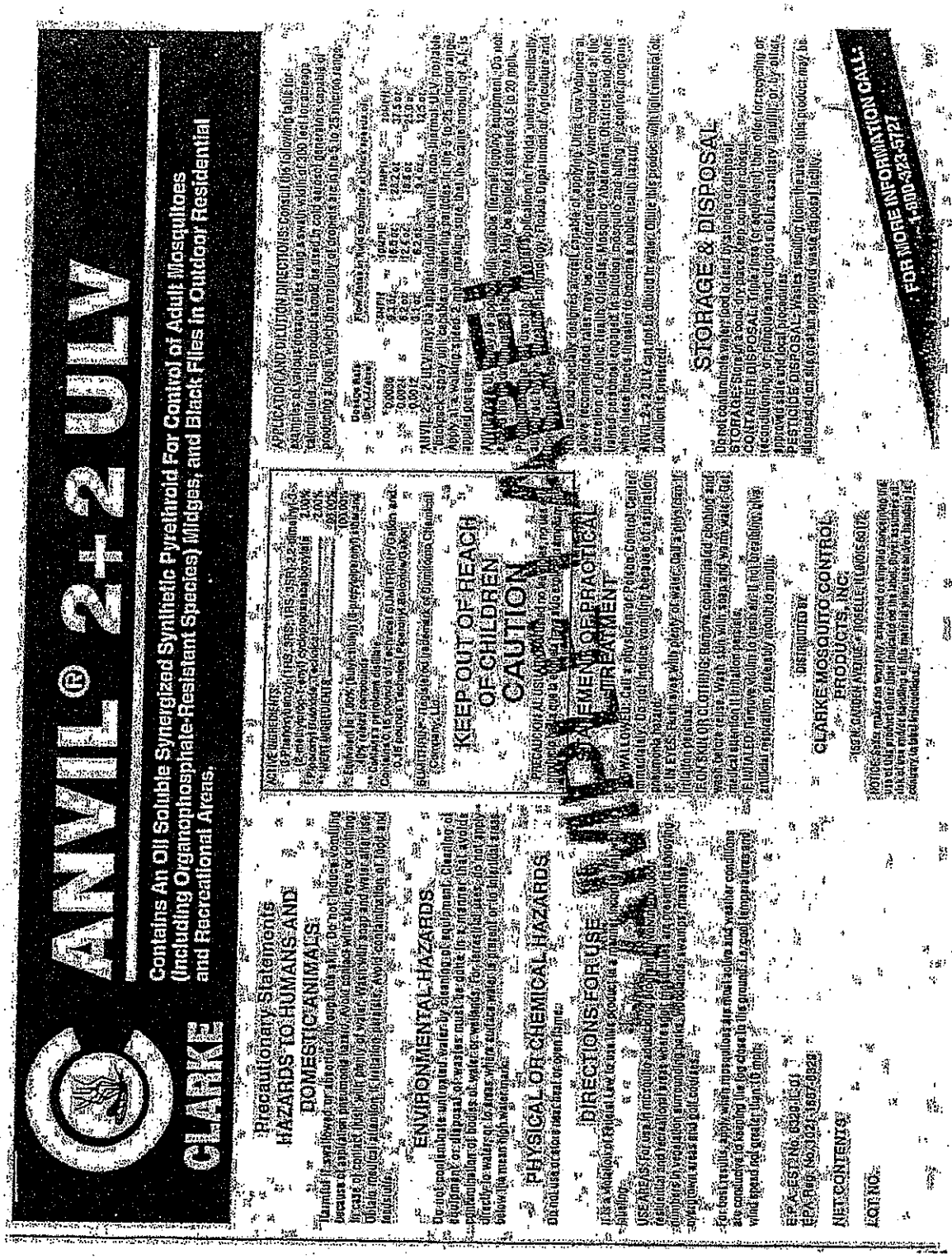
Wellmark

Wellmark International
Schaumburg, Illinois U.S.A.

ZOECON Professional Products

Zoecon® A Wellmark International Brand
ALTOSID® XR Extended Residual Briquet and ZOECON® are registered trademarks of Wellmark International.

21-24019 Made in the U.S.A. November 2000 Schaumburg, IL


ANVIL® 2+2 ULV
Contains An Oil Soluble Synergized Synthetic Pyrethroid For Control of Adult Mosquitoes (Including Organophosphate-Resistant Species) Midges, and Black Flies in Outdoor Residential and Recreational Areas,
CLARKE
Precautionary Statements
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
ENVIRONMENTAL HAZARDS
PHYSICAL OR CHEMICAL HAZARDS
DIRECTIONS FOR USE
KEEP OUT OF REACH OF CHILDREN
CAUTION
STATEMENT OF PRACTICAL TREATMENT
STORAGE & DISPOSAL
FOR MORE INFORMATION CALL:
1-800-323-5727
CLARKE MOSQUITO CONTROL PRODUCTS, INC.
ROSELLE, ILLINOIS 60172
NET CONTENTS
LOT NO.

Valent BioSciences Corporation

VectoLex® CG

Biological Larvicide Granules

ACTIVE INGREDIENT:	
Bacillus sphaericus Serotype H5a5b, strain 2362 Technical Powder (670 BsITU/mg)	7.5% w/w
INERT INGREDIENTS	92.5% w/w
TOTAL	100.0% w/w

Potency: This product contains 50 BsITU/mg or 0.023 Billion BsITU/lb.

EPA Reg. No.73049-20
EPA Est. No. 39762-IA-001 Lot No: 5722

INDEX:

1.0 Statement of Practical Treatment
2.0 Precautionary Statements
2.1 Hazard to Humans (and Domestic Animals)
2.2 Environmental Hazards
3.0 Directions for Use
4.0 Storage and Disposal
5.0 Application Directions
6.0 Notice to User

KEEP OUT OF REACH OF CHILDREN
CAUTION
For MEDICAL and TRANSPORT Emergencies ONLY
Call 24 Hours A Day 1-877-315-9819. For All
Other Information Call 1-800-323-9597.

1.0 STATEMENT OF PRACTICAL TREATMENT

If In Eyes: Immediately flush eyes with plenty of water. Get medical attention if irritation persists.

If on Skin: Wash thoroughly with plenty of soap and water. Get medical attention if irritation persists.

2.0 PRECAUTIONARY STATEMENTS

2.1 HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION

Harmful if absorbed through the skin. Causes moderate eye irritation. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling.

2.2 Environmental Hazards

Do not contaminate water when disposing of equipment washwaters or rinsate.

3.0 DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

4.0 STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Do not contaminate water when disposing of equipment washwaters.

Pesticide Storage: Store in a cool, dry place.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

5.0 APPLICATION DIRECTIONS:

MOSQUITO CONTROL

I. For control of mosquito larvae species* in the following non-crop sites:

Habitat:	Rate Range:
Wastewater:	
Sewage effluent, sewage lagoons, oxidation ponds, septic ditches, animal waste lagoons, impounded wastewater associated with fruit and vegetable processing	5-20 lbs/acre**
Stormwater/Drainage Systems:	
Storm sewers, catch basins, drainage ditches, retention, detention and seepage ponds	5-20 lbs/acre**
Marine/Coastal Areas:	
Salt marshes, mangroves, estuaries	5-20 lbs/acre**
Water Bodies:	
Natural and manmade aquatic sites such as lakes, ponds, rivers, canals and streams	5-20 lbs/acre**
Dormant Rice Fields:	
Impounded water in dormant rice fields. (For application only during the interval between harvest and preparation of the field for the next cropping cycle.)	5-20 lbs/acre**
Waste Tires:	
Tires stockpiled in dumps, landfills, recycling plants, and other similar sites	20-80 lbs/acre (1)

(1) 5.2 lbs/1000 sq. ft.

II. For the control of mosquito larvae species* in agricultural/crop sites where mosquito breeding occurs:

Habitats:	Rate Range:
Rice, pastures, hay fields, orchards, citrus groves, irrigated crops	5-20 lbs/acre**

Apply uniformly by aerial or conventional ground equipment. Reapply as needed after 1-4 weeks.

*Mosquito species effectively controlled by VectoLex CG:

Culex spp.	*Psorophora columbiae*
Aedes vexans	*Psorophora ferox*
Aedes melanimon	*Aedes taeniorhynchus*
Aedes sierrensis	*Aedes solicitans*
Aedes nigromaculis	*Anopheles quadrimaculatus*
	Coquillettidia perturbans

**Use higher rates (10 to 20 lbs/acre) in areas where extended residual control is necessary or in habitats having deep water or dense surface cover.

CONTINUED

Materials Handling 5.6

Spills

The most common type of spill the department deals with involves fuel spills while gassing up the backpacks. Of the application chemicals, only Anvil is in liquid form, this is the only real chemical spill hazard Vector has to watch for.

- Report any spill to a supervisor IMMEDIATELY.
- Be familiar with spill response procedures.
- If the spill is in the shop, use floor dry and place the material in appropriate containers.
- If the spill occurs in the field contain the spill with a dirt dike and contact a supervisor.

Container Disposal

VectoLex comes in 40 lb bags. Empty bags can be put directly into the trash compactor behind the county building. Dispose of all cardboard Altosid® containers the same way. Altosid® granular jugs must be washed out three times and punctured. Abate jugs must be washed three times, punctured and disposed of. Anvil comes in 55-gallon barrels; these are to be washed three times. Contact the highway department personnel in the next building to bring a front-end loader to crush the barrel so it cannot be reused.

Washing Clothes

Articles of clothing used during ULV (Ultra Low Volume) spraying are to be washed before being worn again. Wear gloves when handling all chemicals as a basic safety precaution. It is not necessary to wear gloves when handling VectoLex but since it smells like dead mayflies and the smell does not come off your hands, wearing gloves is a good idea or lunch might not be too appetizing.

Material Safety Data Sheets (MSDS) 5.7

Occupational Safety and Health Administration (OSHA) required MSDS sheets are on file in the garage and at the office for every chemical the department uses. These sheets are available to any employee wishing to review the information on them.

Chapter 6 Surveillance and Treatment

Rainfall and Water Levels Monitoring 6.1

Much of the nuisance control work that LCHD does is dependent on rainfall. In dry years, the temporary pools making up much of the breeding areas disappear. In wet years, such as 2004, pools appear where there were not any before. As rainfall increases, the margins of the pools expand, flooding eggs laid in previous years. If not caught early in the season, a mega hatch can occur where several years' accumulation of eggs will hatch within a week or two. Under these conditions, monitoring has to be continuous and records kept up-to-date.

Dipping Procedures 6.2

The department uses a standard entomological dipper to sample wetlands. When dipping in wetlands sample every 6-8 feet along the margin of a wetland for 75-100 feet. Do not make splashing noises or overshadow the sample area. Larvae will instinctively dive when a shadow appears over them.
Depending on the water temperature, mosquito eggs will hatch in 20 minutes to 24 hours after being flooded.

First instar larvae are found near the wetland margin, are about 1/8 inch long, and are nearly transparent. As the larvae grow, they will scatter into deeper water.

Determining the Number of Larva per Dip 6.3

When sampling an area, count the number of larvae per dip. Treatment threshold is five larvae per dip.

Since container-breeding mosquitoes are a health hazard, all containers are treated or dumped if they are holding water.

Adult Trapping 6.4

LCHD has a full range of trapping equipment. Its traps include ovitraps light traps, CO_2 traps and gravid traps.

- Ovitraps are the primary trap LCHD Vector uses. An ovitrap is a beer can with the top cut off with a mounting wire clipped to it. Breeding paper (this looks like a brown paper towel) is placed in the can and the can is filled with water. Ovitraps have two purposes. The first is to obtain information on infection rates in mosquitoes, the second, is to reduce population levels at case sites. The traps are checked every ten days, the water dumped, papers pulled and replaced, bagged, and labeled, and fresh water poured into the cans.

- When setting an ovitrap line, try to nail the traps to the north or east side of the tree to prevent evaporation. Each trap line has five traps attached 12-15 inches off the ground.

- CO_2 traps use dry ice as a bait source and are to obtain mosquito counts for an area.

- New Jersey light traps are to monitor disease vectors and to do mosquito population studies. They require 110 volt electric power at the site.

- Gravid traps are an integral part of West Nile Virus work. They use a nutrient rich water (it smells horrible but the female mosquitoes love it) to attract female mosquitoes looking to lay eggs. Because gravid traps use a battery-powered fan to pull the mosquitoes into the trap, they must be checked every day. If the battery dies, the females will fly out the bottom of the trap. The primary target mosquitoes are the three local *Culex* species, *tarsalis, pipiens, and restuans*. The Minneapolis Metro district has had its best luck with gravid traps placed at the ends of culverts. LCHD has had its best luck under large deciduous trees where birds roost.

- When setting or checking trap lines there are several points to note. Learn to recognize poison ivy and cow parsnip; the juice of the cow parsnip plant is photo reactive. It will create a nasty burn on exposure to sunlight. A permanent scar can result from burn. Place traps away from these plants and try not to route access paths through these areas.

- If you are checking a can line and you find dry traps, be very careful. Brown recluse spiders and wolf spiders love to set up house keeping in dry traps. If a spider bites you, you must see a doctor. Brown recluse bites will not heal without medical attention.

Record Keeping 6.5

Vector Control divided the La Crosse County into four areas, Labeled I, II, III, and IV, these areas have historic breeding areas mapped out and numbered. As you check each of these areas, fill out the results on the DAILY INSPECTION AND TREATMENT REPORT. The minimum amount of information needed is the Area Number, Date, Inspector, Site Number, Wet Breeding, or Wet Not Breeding or Dry, Larvae per Dip, Treatment and the Amount Used. See Figure 6.1 for an example of a Treatment report.

LA CROSSE COUNTY MOSQUITO CONTROL PROGRAM

DAILY INSPECTION AND TREATMENT REPORT

District _____ Inspector _____

Date _____ Inspector _____

Number	Site Identification		Inspection Record				Treatment Record			Remarks
	Twp.	Sec.	Wet Breed	Wet No Breed	Dry	U/P Per Dip	Treatment type (BTI, 30 BTI, Altosid)	Amount Used	Area Treated (100 yds. X 10 yds.)	

Figure 6.1

The department requires employees to keep a daily log. The purpose of the daily log is to track billing for contract work in other counties. When working in other counties, employees log their activities in each town or site, chemical used and mileage for the day.

Tire Survey Procedures 6.6

The focus of the department's work is mosquito borne disease control. Originally developed to control La Crosse encephalitis, these procedures also apply to West Nile Virus control.

Tires make an ideal breeding site for *Ochlerotatus triseriatus*. They hold water for a long time, the openings are large enough to collect windblown debris for a nutrient supply, and they warm up to ideal developmental temperatures when exposed to the sun. In 80% of LAC cases in the area, discarded tires were within 200 yards of the case site.

Studies show that in natural habitat, larval development takes 21 days with a 5-10% survival rate to adulthood. In tires, the development rate shortens to 7 days and the survival rate can approach 90%. These conditions result in logarithmic growth of a disease vector in areas close to human habitation. Dr. Barry Beatty's work at Colorado State University shows a 1-2% infection rate in the *Oc. Triseriatus* population in the upper Mississippi River valley.

Instead of having a tree hole harboring 100 females, of which 1-2 are infected; a small pile of tires in a weed patch behind a shed can have a population of 2-3,000 females with 60 infected females.

LCHD does most of its tire survey work is in cities and villages. Tire surveys work best with a two-person team, each watching his or her side of the street or alley. Divide the town into grids, and then methodically work each grid, driving down alleys wherever possible. When

you see tires on farms, especially on bunk silos, you are to stop and contact the owner, explaining why you are there and try to educate the owner about the risks.

When you find tires, record the address, if the location is a business, the name of the business and a description of what you found. Try to contact the owners by going to the door. If no one is home, leave literature with LCHD's phone number and a note explaining what you found.

Tire Treatment and Removal 6.7

Treat the tires with Abate unless you feel there would be some risk to pets or small children; in those cases, use Bti. The department is not in the business of hauling away tires, exceptions are made for isolated tires where there is no obvious property owner or the owner is elderly.

Tire Survey Record Keeping 6.8

Record the chemical you used to treat the tires. When recording information **do not** use N.T. for no tire or no treatment, **write it out.** The use of the letters, N.T., has caused confusion for the secretary when she loads the information into the database. See Figure 6.2 for an example of a tire survey sheet.

County	Town	Inspected by:	Treatment	Comment
Vernon	Chaseburg	Bill & Taylor		
July 16				

Owner or Business name	123 Cactus Dr.	Chaseburg	Abate 5%	No treatment	
			June 1	Tires still there	

Figure 6.2 Tire Survey Sheet

Chapter 7 Mosquito and Tick Borne Diseases

La Crosse Encephalitis 7.1

La Crosse encephalitis (LAC), first identified in La Crosse in 1963, is endemic to the upper Mississippi River valley. Several factors worked together to make this a common disease.

Before settlers came to the area, in the late 1840's and 1850's, the biome was oak savannah. The disease developed in scattered older oaks as they aged and died. With the coming of the settlers, the land was subdivided and the open prairie fires could no longer run. The oak forest we know today grew because there were no prairie fires. For the first half of the twentieth century the disease still was not a problem because the trees were young, most people lived a distance away from the forest, containers were "tin" and therefore rusted out, and tires were small, made of natural rubber and rotted quickly.

In the 1960's several factors converged to cause La Crosse encephalitis LAC case numbers to begin rising. Until the 1970's, area farmers practiced "erosion control" by throwing household garbage into the nearest ditch to stop the ditch's progress through their land. While the tin and tires disintegrated, the glass containers did not. In 2004, the department did a cleanup of the U.S. Forestry Department Experimental Station site at the top of Granddad Bluff. Vector employees picked up glass jugs that had lain there for 60 years. Another convergent factor was the expansion of the suburbs into wooded areas. Thousands of oak trees were cut to clear lots and to provide a view down the valleys. This practice left stumps whose centers quickly rotted out leaving a small water-holding container. A third factor was tire construction. Tires were now larger and made from more durable, synthetic materials. When discarded into the environment, they lasted a long time.

All the pieces were in place for LAC case numbers to accelerate. Humans had unnaturally multiplied the number of habitat sites for the mosquitoes and then, large numbers of people moved into those habitat areas. By the 1970's, LCHD's historic contract area was averaging 25 to 35 cases a year with several mortality cases.

In 1979, Dr. James Parry of the University of Wisconsin, La Crosse and Dr. Cameron Gunderson of Lutheran Hospital obtained funding to launch a public health response to LAC. Dave Geske joined LCHD as the program manager. Since its beginnings in La Crosse County, LCHD extended its service area to seventeen counties in Wisconsin, northeastern Iowa, and southeastern Minnesota. It services an area from the Illinois border to St. Croix County.

Because of LCHD's vector control program, the number of LAC cases in the service area has fallen to five or six cases a year.

Eastern Equine Encephalitis 7.2

Eastern Equine Encephalitis (EEE) transmits through the bite of an infected female *Culiseta melanura* mosquito that fed on an infected bird. Birds appear to be unaffected carriers. The disease can be fatal for unvaccinated horses. EEE has a 35% case fatality rate in humans, making it a very pathogenic mosquito borne disease. The Department of Agriculture is responsible for tracking equine cases. This disease is most common on the east and south coasts of the country. Wisconsin had one recorded case in 1984.

Western Equine Encephalitis 7.3

Western Equine Encephalitis (WEE) occurs naturally between birds and mosquitoes. Outbreaks occur in years that favor *Culex tarsalis,* its primary vector. WEE is most common in states west of the Mississippi, the highest numbers of cases are found in California and Arizona. Wisconsin had two human cases between 1964 and 2000. The department of Agriculture also tracks equine WEE cases.

West Nile Encephalitis 7.4

Several mosquito species are vectors for West Nile Virus (WNV) The most common carriers endemic to the upper Mississippi River valley are the three *Culex* species *pipiens, restuans* and *tarsalis.* Several other mosquito species that feed on birds transmit the virus as they switch from birds to humans. *Oc. triseriatus* is a competent WNV vector. WNV infections are almost 100% fatal in *Corvids* (crows and jays). The Department of Natural Resources tracks the WNV avian cases.

County health departments follow local human cases and the CDC follows the disease nationally. WNV infections are most severe in people over 50 and those with compromised immune systems. Originally thought to have a 15% human case death rate in North America, the high fatality rate appears to be a function of the cost of testing. Since there is no treatment, many doctors are doing antibody testing only on people with severe symptoms. If you only test the sickest component of your population, your results will show an artificially high fatality rate. WNV infection rates are now thought to be more widespread than early data showed, but less lethal.

Tick Borne and New Arboviral Diseases 7.5

In the 1980's the blacklegged tick *Ixoides scapulara,* migrated to the area on migratory birds. The ticks carry three diseases, Lyme disease, Babesiosis, and Erlichosis. Lyme and Erlichosis are bacterial spirochete diseases while Babesiosis is a protozoan, malaria-like infection. The only real choices available to the public are education and personal protection. LCHD Vector Control provides educational services to the public.
As Vector Control field staff, you will be exposed to ticks on a daily basis. Do tick checks when you get home and wear the repellent the department provides for you.

Because of the increasingly mobile world population, diseases from various parts of the globe will appear just about anywhere. Imported mosquito species like *Aedes albopictus,* the Asian tiger mosquito, aggressive biters and arboviral sponges, can transmit just about any arboviral disease from dengue fever, now moving north from Central America, to yellow fever and Rift Valley Fever

Chapter 8 Equipment

Backpack Sprayers 8.1

Vector Control uses several different makes of backpack sprayers. All function in a similar manner. The Maruyama sprayers are dry pellet sprayers powered by a small 2-cycle chainsaw type engine. When properly tuned, they are capable of sending a stream of VectoLex pellets out approximately 30 feet. A 60-foot swath of wetland can be covered by wading 30 feet out from shore and then moving parallel to the shore. Use setting #5 for VectoLex pellets to achieve an application rate of 5lbs per acre.

A rule of thumb for spraying is if you can see a stream of granules leaving the end of the nozzle your application rate is too high. Watch for a light sprinkling of splashes in the water; these will provide feedback on your application rate.

When transporting the backpacks, secure them in the back of the truck.

Grizzly LPHV Sprayer 8.2

The Grizzly LPHV (Low Pressure High Volume) sprayer is the department's adulticide fogger. It is designed to be loaded on the pickup truck using the engine hoist. The department uses the sprayer loaded with Anvil® when wind velocity is less than 5 mph. When fogging, never allow drift to cross over running water. Anvil® carries a warning label against using it near water containing fish.

Before leaving the shop, check fuel and fluids.

Argo All Terrain Vehicle 8.3

The department uses the Argo all terrain vehicle to access areas of the marsh that are difficult to access on foot.

Before leaving the shop, do a fluids check on the engine. Check the gas, oil, and radiator fluid. Do not attempt to check the radiator fluid when the engine is hot. Check the tires. Several times during the summer, it is a good idea to pull all eight tires off and cut the grass off the axles. The wheel bearings are RS grade bearings. This means they are rubber sealed and the grass will eventually cut the seal on the bearing leading to premature failure.

It is also important to listen to the drive chains under the floor. Adjust the slack out of them when they start banging excessively on the floor.

For further operations instructions, read the operations manual.

Remember: do not run over stumps. It is very easy to hang up on them and the nearest tree is guaranteed to be five feet farther away than the length of your winch cable.

There are several safety procedures to remember when using the winch.

- Do not overload the winch motor. If the motor stalls, stop, and try something else.
- Stay clear of the cable area. Never step over a taut cable or get between the winch and the load.
- Wear gloves when handling the winch cable. Never allow wire rope to slide through your hands.
- Avoid pulling at extreme angles.
- Stay clear, if the hook suddenly lets go, it can turn into a 2 lb bone-smashing projectile.
- Inspect the cable often. Replace the cable if it begins to fray.

Cell Phones *8.4*

When going out into the swamp, leave your cell phone in the truck or put it in a Ziploc bag. A cell phone will not survive immersion.

Chapter 9 General Safety

No Smoking 9.1

The department restricts smoking inside the garage because of the flammable materials the department uses. Larva samples are preserved in ethyl alcohol and gasoline is mixed inside the garage for the 2-cycle backpack engines. Various other flammable agents are stored in the garage; ether, also known as starting fluid, for starting balky engines, is extremely flammable. The department occasionally has ethyl acetate for kill jars. Ethyl acetate has a low flash point; jars of it left on hoods of cars in sunlight have exploded.

Safe Lifting Techniques 9.2

The Bureau of Labor Statistics reports that nationally 20% of injuries nationwide are back injuries. At the Metropolitan Mosquito Control District in the Twin Cities, back injuries account for 34% of all injuries. When you work for Vector Control, you will be lifting 40-pound bags of VectoLex regularly. You will also be lifting 50-pound backpacks and walking through mud and water, twisting back and forth, while spraying in 180° arcs.

The Yale University Joint Health and Safety Committee wrote these lifting safety techniques.

Before lifting a load, it is important to survey the load and the work area.

- First, determine if you can lift the required load. If not get help.
- Clear obstructions from your path.
- Get a firm footing. Keep your feet apart, with one foot alongside the load and the other behind you for support.
- Center your body over your feet.

Steps for Lifting and Unloading 9.3

Lifting

1. Stand close to the load.
2. Grip firmly with your hands, not just your fingers.

3. Bring the load close to your body for more power and less strain. Keep your arms and elbows tucked in for more power. Keep your weight centered.

4. Let your legs do the work. Lift your head and shoulders first, then let your legs push your body up slowly and smoothly.

5. Make sure you can see where you're going. Move slowly with small steps.

6. Don't twist your body. Twisting is a major cause of injury. If you have to change direction, move your feet first.

Unloading

1. To unload, face the spot you have chosen and lower the load slowly.

2. Bend your knees, and let your legs, not your back do the work.

3. Keep your fingers away from the bottom and place the load on the edge of the surface, then slide into place.

http://www.yale.edu/oehs/snote595.htm

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