THE COMMONWEALTH OF MASSACHUSETTS

EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS

Department of Agricultural Resources

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MDAR MASSACHUSETTS DEPARTMENT OF AGRICULTURAL RESOURCES

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Governor	Lt. Governor	Secretary	Commissioner

TO: Commissioner Monica Bharel (DPH)
Commissioner John Lebeaux (MDAR)
Commissioner Martin Suuberg (DEP)
Commissioner Leo Roy. (DCR)

FROM: State Reclamation and Mosquito Control Board

DATE: August 20th, 2020

RE: M.G.L. c. 252, Section 2A Summary Report: Aerial adulticiding intervention response to Eastern Equine Encephalitis virus (EEEv), Massachusetts conducted on August 10, 2020

On August 10, 2020, the State Reclamation and Mosquito Control Board ("SRB"), operating within the Massachusetts Department of Agricultural Resources ("MDAR"), in collaboration with regional Mosquito Control Districts and Projects ("MCDs"), and the Massachusetts Department of Public Health ("DPH") planned, implemented, and supervised an aerial mosquito control spray operations. The aerial spray took place primarily within Plymouth County but also included a small bordering area of Bristol County. As required by M.G.L.c. 252, Section 2A the Board hereby submits its summary report concerning the emergency response that was conducted on August 10, 2020.

Based on data collected in 2019 and 2020 by the Department of Public Health Arbovirus Surveillance Program issued a determination on August 4, 2020 that there was an elevated risk of EEEv in parts of southeastern Massachusetts (***see Appendix 1***).

The 2020 mosquito season got off to a slow start due to cooler than average spring temperatures and a lack of precipitation.

More typical EEE activity did appear in the southeastern part of the state, in Carver and Middleborough (Plymouth County), beginning in mid-July. By the last week of July, 26 EEE-positive mosquito pools were found in area, causing DPH to raise Carver and Middleborough to an EEE risk level of High

DPH announced and issued a "*Certification of Public Health Hazard that Requires Pesticide Application to Protect Public Health"* for Bristol and Plymouth Counties, certifying that the aerial application was necessary to protect the public (***see Appendix 2***) on August 8, 2020In response, the Board held an emergency meeting on August 8, 2020 and approved aerial adulticide intervention to reduce the abundance of adult mosquitoes infected with EEEv. The Board, operating through MDAR and contractors, immediately began to carry out the logistics of aerial adulticide spray operations, including

procuring planes and insecticides, coordinating GIS mapping, obtaining the Massachusetts Endangered Species Emergency Authorization Permit, facilitating extensive communications between agencies following the declaration of public health hazard, providing notifications as required by M.G.L.c. 252, Section 2A, and providing oversight at the airport/staging area of the operation itself. The public health certification remains in effect until August 31, 2020.

Clarke Mosquito Control Products, Inc. ("Clarke") was the contractor used for the aerial adulticide intervention. The pesticide used was Anvil 10+10 ULV (***see Appendix 3***), EPA Registration number 1021-1688-8329. Anvil 10+10 ULV contains the active ingredients d-phenothrin (Sumithrin) and the synergist piperonyl butoxide (PBO). Dynamic Aviation, the subcontractor used during the event, provided aviation solutions and associated GIS services.

The 2020 emergency mosquito response began at 8pm on August 10, 2020 and ended at approximately 2am on August 11, 2020. Three planes covered the entire spray area, which totaled 178,823 acres sprayed using 985 gallons of Anvil 10+10 ULV. Towns that were included either fully or partially in the spray area included:

Bristol County: Acushnet, Easton, Raynham, Taunton

Plymouth County: Bridgewater, Carver, Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Kingston, Lakeville, Marion, Mattapoisett, Middleborough, Norwell, Pembroke, Plymouth, Plympton, Rochester, Rockland, Wareham, West Bridgewater, Whitman

A map is provided below:

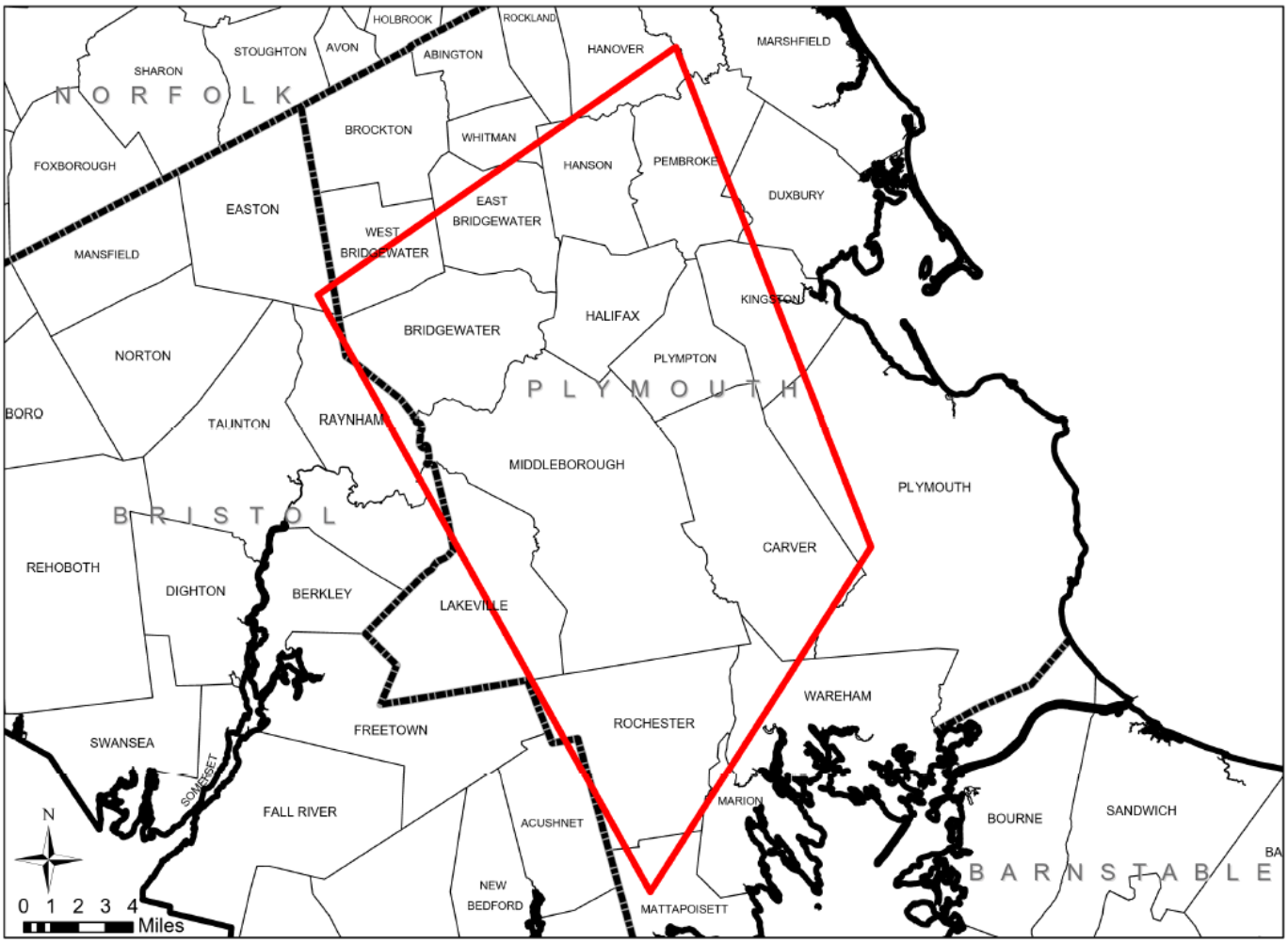

Table 1 shows the efficacy calculations for the spray event that took place on the evening Monday, August 10, 2020. (data and calculations provided by MDPH). The table breaks down the data to show not only total reduction in mosquitoes, but reductions in *Coquillettidia perturbans*, the mammal-biting "bridge vector" that is most likely to spread EEEv to humans.

Table 1: Spray Efficacy

Spray Event (Counties)	Date	Total Reduction in Mosquitoes Trapped	Reduction in *Cq. perturbans*
Plymouth	8/10/2020	70%	82%

Data Source: MDPH

Calculations were corrected using the Henderson-Tilton formula (http://www.ehabsoft.com/ldpline/onlinecontrol.htm)

Appendix 1: DPH Determination of Elevated Risk of Arbovirus

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Department of Public Health
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DETERMINATION OF ELEVATED RISK OF ARBOVIRUS

WHEREAS, Eastern Equine Encephalitis virus (EEE) and West Nile Virus (WNV) are mosquito-borne viruses, or arboviruses, which are found in the local environment in Massachusetts and are capable of causing serious disease and death in humans, horses, and other mammals;

WHEREAS, EEE and WNV are arboviruses deemed by the Department of Public Health to be dangerous to the public health pursuant to G.L. c. 111 §6;

WHEREAS, EEE infection causes a rare but serious neuroinvasive disease that causes meningitis or encephalitis, and often results in death or severe disability;

WHEREAS, WNV infection is more common, though typically less severe than EEE, with presentation of symptoms ranging from febrile illness to neuroinvasive disease;

WHEREAS, there are no available vaccines to prevent human infections from either of these mosquito-borne viruses and there are no available treatments for either disease; and,

WHEREAS, to monitor and protect the public health in the Commonwealth, the Department of Public Health Arbovirus Surveillance Program (ASP), in collaboration with the Department of Agricultural Resources, State Reclamation and Mosquito Control Board, and regional Mosquito Control Districts, conducts surveillance for mosquito-borne viruses focused on EEE and WNV and analyzes present and historic trends,

NOW THEREFORE, pursuant to G.L. c. 252 §2A(a), and based on the data collected and analyzed by the ASP, summarized in the report "Arbovirus Surveillance in Massachusetts, 2019" (https://www.mass.gov/lists/arbovirus-surveillance-plan-and-historical-data) and the 2020 data collected to date (https://www.mass.gov/info-details/massachusetts-arbovirus-update), including identification of EEE and WNV in species of mosquitos which bite mammals, I have determined that there is an elevated risk of arbovirus in the Commonwealth for 2020.

Monica Bharel, MD, MPH
Commissioner, Massachusetts Department of Public Health

August 4, 2020

Appendix 2: Certification of Public Health Hazard

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Department of Public Health
250 Washington Street, Boston, MA 02108-4619

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CERTIFICATION OF PUBLIC HEALTH HAZARD THAT REQUIRES PESTICIDE APPLICATION TO PROTECT PUBLIC HEALTH

On August 4, 2020, I determined, pursuant to G.L. c. 252 §2A(a) that there is an elevated risk of arbovirus in the Commonwealth for 2020.

Current public health surveillance information indicates an increased risk of eastern equine encephalitis (EEE) in humans in certain parts of Massachusetts, and a public health hazard exists in the areas specified below. Application of pesticides by aerial spraying in areas known to harbor mosquitoes carrying the EEE virus is necessary to protect the public health. In order to apply pesticides in certain legally protected areas, the certification below is necessary.

Property Owner Exclusions

The Massachusetts Pesticide Regulations prescribe the methods by which persons living in or legally in control of lands may designate such lands for exclusion from the application of pesticides (333 CMR 13.03). However, 333 CMR 13.03(3)(b) provides that requests for exclusion shall not be honored in those cases in which "The Commissioner of Public Health has certified that the application is to be made to protect the Public Health." The effect of this certification is that the applicators engaged in aerial pesticide applications are not required to honor designations for exclusion made by persons living in or legally in control of lands to which the pesticides may be applied.

Endangered Species

Division of Fisheries and Wildlife (DFW) regulations prohibit the taking of any state or federally listed animal or plant species, with limited exceptions specified in 321 CMR 10.04. One exception is to protect human health during the period and within the geographic area of a public health hazard as certified in writing by the Commissioner of Public Health (321 CMR 10.04(3)(e)). Under such circumstances, DFW may issue a permit to take endangered species if it has found that all reasonable efforts have been undertaken to avoid the removal, capture or destruction of such species.

Commissioner Certification

I hereby certify, pursuant to 333 CMR 13.03(3)(b) and 321 CMR 10.04(3)(e), that a public health hazard exists in the areas of Massachusetts specified below and that application of pesticides by aerial spraying in areas known to harbor mosquitoes carrying the EEE virus is necessary to protect the public health.

The areas covered by this certification are those areas of Bristol and Plymouth Counties determined by Department of Public Health surveillance data to warrant aerial pesticide application to protect public health. This certification shall remain in effect until August 31, 2020.

Monica Bharel, MD, MPH
Commissioner, Massachusetts Department of Public Health
August 8, 2020

Appendix 3: Product Label for Anvil 10+10 ULV

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clarke

ANVIL® 10+10 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.

ACTIVE INGREDIENTS:	
3-Phenoxybenzyl-(1RS, 3RS; 1RS, 3SR)-2,2-dimethyl-3-(2-methylprop-1-enyl) cyclopropanecarboxylate	10.00%
*Piperonyl Butoxide	10.00%
**OTHER INGREDIENTS	80.00%
	100.00%

Contains 0.74 lbs. Technical SUMITHRIN®/Gallon and 0.74 lbs. PBO/Gallon

*(butylcarbityl)(6-propylpiperonyl) ether and related compounds

**Contains petroleum distillate

KEEP OUT OF REACH OF CHILDREN

CAUTION

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

FIRST AID	
IF SWALLOWED:	• Immediately call a poison control center or doctor. • Do not induce vomiting unless told to do so by a poison control center or a doctor. • Do not give **any** liquid to the person. • Do not give anything by mouth to an unconscious person.
IF ON SKIN OR CLOTHING:	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
NOTE TO PHYSICIAN	
Contains petroleum distillate - vomiting may cause aspiration pneumonia.	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For information regarding medical emergencies or pesticide incidents, call 1-888-740-8712.	

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Harmful if absorbed through the skin. Avoid contact with skin, eyes and clothing. In case of contact, flush with plenty of water. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are: barrier laminate, nitrile rubber, neoprene rubber or Viton. Mixers, loaders, applicators, and other handlers must wear long-sleeved shirt, long pants, shoes and socks. In addition, all handlers except for applicators using motorized ground equipment, pilots, and flaggers, must wear chemical-resistant gloves. See engineering controls for additional requirements.

USER SAFETY REQUIREMENTS

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

USER SAFETY RECOMMENDATIONS

Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. User should remove clothing/PPE immediately if pesticide gets inside, then wash thoroughly and put on clean clothing. User should remove PPE immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.

ENGINEERING CONTROLS

Pilots must use an enclosed cockpit that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(6)]. Human flagging is prohibited. Flagging to support aerial applications is limited to use of the Global Positioning System (GPS) or mechanical flaggers.

ENVIRONMENTAL HAZARDS

This product is toxic to aquatic organisms, including fish and invertebrates. Runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish and aquatic invertebrates. Before making the first application in a season, it is advisable to consult with the state or tribal agency with primary responsibility for pesticide regulation to determine if other regulatory requirements exist. Do not apply over bodies of water (lakes, rivers, permanent streams, natural ponds, commercial fishing ponds, swamps, marshes or estuaries), except when necessary to target areas where adult mosquitoes are present, and weather conditions will facilitate movement of applied material away from the water in order to minimize incidental deposition into the water body. Do not contaminate bodies of water when disposing of equipment rinsate or wash waters.

This product is highly toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the area, except when applications are made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes, or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

PHYSICAL OR CHEMICAL HAZARDS

Do not use or store near heat or open flame.

DIRECTIONS FOR USE

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

USE RESTRICTIONS:

For use by federal, state, tribal, or local government officials responsible for public health or vector control, or by persons certified in the appropriate category or otherwise authorized by the state or tribal lead pesticide regulatory agency to perform adult mosquito control applications, or by persons under their direct supervision.

IN CALIFORNIA: This product is to be applied by County Health Department, State Department of Health Services, Mosquito and Vector Control or Mosquito Abatement District personnel only.

IN FLORIDA: Aerial applications of this product require trained personnel to perform industry accepted assays to monitor resistance formation in targeted mosquitoes.

Do not treat a site with more than 0.0036 lbs of Sumithrin® or 0.0036 lbs of PBO per acre in a 24-hour period. Do not exceed 0.1 lb of Sumithrin® or PBO per acre in any site in any year. More frequent applications may be made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

NOTE: When rotating products with other insecticides containing PBO, do not exceed 2 lbs PBO per acre per year.

Not for use in outdoor residential misting systems.

USE INFORMATION

ANVIL 10+10 ULV is approved for application as a thermal aerosol and an Ultra Low Volume (ULV) nonthermal aerosol (cold fog) in mosquito adulticiding programs involving outdoor residential and recreational areas where adult mosquitoes are present in annoying numbers in vegetation surrounding parks, woodlands, swamps, marshes, overgrown areas and golf courses. ANVIL 10+10 ULV may be applied over agricultural areas for the control of adult mosquitoes within or adjacent to the treatment areas.

For best results, apply when mosquitoes are most active and weather conditions are conducive

AL0398

SAMPLE LABEL

to keeping the fog close to the ground. Application in calm air conditions is to be avoided. Apply only when wind speed is greater than or equal to 1 mph. All types of applications should be conducted at temperatures above 50 °F.

NOTE: ANVIL 10+10 ULV cannot be diluted in water. Dilute this product with light mineral oil if dilution is preferred.

SPRAY DROPLET SIZE DETERMINATION

Ground-based, wide area mosquito abatement application: Spray equipment must be adjusted so that the volume median diameter is less than 30 microns (Dv 0.5 < 30 µm) and that 90% of the spray is contained in droplets smaller than 50 microns (Dv 0.9 < 50 µm). Directions from the equipment manufacturer or vendor, pesticide registrant, or a test facility using a laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

Aerial Equipment, wide area mosquito abatement application: Spray equipment must be adjusted so that the volume median diameter produced is less than 60 microns (Dv 0.5 < 60 µm) and that 90% of the spray is contained in droplets smaller than 80 microns (Dv 0.9 < 80 µm). The effects of flight speed and, for non-rotary nozzles, nozzle angle on the droplet size spectrum must be considered. Directions from the equipment manufacturer or vendor, pesticide registrant, or a test facility using a wind tunnel and laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

GROUND ULV APPLICATION

Apply ANVIL 10+10 ULV through a standard ULV cold aerosol or non-thermal aerosol (cold fog) generator. Consult the following table for examples of various dosage rates using a swath width of 300 feet for acreage calculations. Vary flow rate according to vegetation density and mosquito population. Use higher flow rate in heavy vegetation or when populations are high.

Dosage Rate of each a.i. (Lbs. Sumithrin® and PBO per acre)	Fl.oz. ANVIL 10+10 ULV per Acre	Flow Rates in fluid oz./minute at truck speeds of:			
		5 MPH	10 MPH	15 MPH	20 MPH
0.0036	0.62	1.9	3.8	5.7	7.6
0.0024	0.42	1.3	2.5	3.8	5.1
0.0012	0.21	0.6	1.3	1.9	2.5

ANVIL 10+10 ULV may also be applied with non-thermal, portable, motorized backpack equipment adjusted to deliver ULV particles of less than 100 microns VMD. Use 0.21 to 0.62 fl. oz. of the undiluted spray per acre (equal to 0.0012 to 0.0036 lb. a.i./acre) as a 50 ft. (15.2 m) swath while walking at a speed of 2 mph (3.2 kph). Dilute with a suitable mineral oil if dilution is preferred. Do not exceed 0.62 fl. oz. of the undiluted spray per acre. Do NOT use portable backpack equipment for application in enclosed spaces.

ANVIL 10+10 ULV may be applied through truck mounted thermal fogging equipment. Do not exceed the maximum rates listed above. May be applied at speeds of 5 to 20 mph. To reduce oil requirement and sludge buildup in equipment, use a 60 - 100-second viscosity mineral "fog" oil, or other fuel-type oil. Use a clean, well-maintained and properly calibrated fogger. Do not wet foliage since oil base formulations may be phytotoxic. For use with hand carried foggers, use same rates of active ingredient per acre and a swath width of 50 ft with a walking speed of 2 mph. Fog downwind, with the wind at your back. Do NOT use hand-carried foggers for application in enclosed spaces.

AERIAL APPLICATION

ANVIL 10+10 ULV may be applied at rates of 0.21 to 0.62 fluid ounces ANVIL 10+10 ULV per acre by fixed wing or rotary aircraft equipped with suitable ULV application equipment. ANVIL 10+10 ULV may also be diluted with a suitable solvent such as mineral oil and applied by aerial ULV equipment so long as 0.62 fluid ounces per acre of ANVIL 10+10 ULV is not exceeded. Do not apply by fixed wing aircraft at a height less than 100 feet above the ground or canopy, or by helicopter at a height less than 75 feet above the ground or canopy unless specifically approved by the state or tribe based on public health needs.

STORAGE AND DISPOSAL

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

PESTICIDE STORAGE: Store in a cool, dry place. Keep container closed.

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

CONTAINER HANDLING: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with mineral oil and recap. Shake for 10 seconds. Pour rinsate into application equipment or a rinse tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

CONTAINER HANDLING: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into rinsate collection system. Repeat this rinsing procedure two more times. Offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

NOTICE: To the extent provided by law, seller makes no warranty, expressed or implied, concerning the use of this product other than as indicated on the label. Buyer assumes all risk of use and/or handling of this material when use and/or handling is contrary to label instructions.

ANVIL™ is a Trademark of Clarke Mosquito Control Products, Inc.
Sumithrin ® is a Trademark of Sumitomo Chemical Co, Ltd.

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NET CONTENTS: [ ] 2.5 GAL [ ] 30 GAL [ ] 55 GAL [ ] 275 GAL

LOT NO.:

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