
ENVIRONMENTAL ASSESSMENT

For aerial application of pesticide for mosquito control on Army Corps of Engineers property near city of Williston, North Dakota

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ENVIRONMENTAL ASSESSMENT ORGANIZATION

DOCUMENT OVERVIEW

This Environmental Assessment (EA) addresses the aerial control of mosquitoes on Army Corps of Engineers property near Williston, North Dakota (ND) to include the City of Williston and surrounding County lands. The EA is prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, and in accordance with: 32 CFR Part 989; Title 40, Code of Federal Regulations (CFR), Part 1500-1508, Council on Environmental Quality; Department of Defense (DoD) Instruction 4150.7, DoD Pest Management Program; and Air Force Instruction (AFI) 32-1074, Aerial Application of Pesticides.

The SUMMARY briefly describes the need for proposed action, location, relevant Federal statutes, alternatives considered, and the preferred alternative.

- Section 1 PURPOSE AND NEED FOR ACTION, provides the background for this action and outlines objections and decisions to be made.
- Section 2 DESCRIPTION OF THE PROPOSED ACTION, describes the aerial application of pesticides for mosquito control.
- Section 3 ALTERNATIVES CONSIDERED, discusses the preferred implementation action and alternatives.
- Section 4 AFFECTED ENVIRONMENT, presents the environmental and socioeconomic setting of Williston and adjacent area.
- Section 5 ENVIRONMENTAL CONSEQUENCES, covers the potential direct environmental effects of the control action and describes planned mitigation actions.
- Section 6 CUMULATIVE IMPACTS
- Section 7 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES, identifies the tangible costs of the proposed action.
- Section 8 CONCLUSION, presents what was determined after examining the best currently available information.
- Section 9 PUBLIC PARTICIPATION, describes measures taken to inform and involve the public of the control action.
- Section 10 AGENCIES AND PERSONS CONSULTED, provides a list of people and agencies that provided information to the preparers of this report.
- Section 11 PREPARERS, identifies the people who prepared or contributed to the report, and their affiliations.
- Section 12 REFERENCES, provides bibliographical information for sources cited in the text of the report.
- Section 13 ACRONYMS AND ABBREVIATIONS
- Section 14 APPENDICIES

ENVIRONMENTAL ASSESSMENT
FOR
AERIAL APPLICATION OF PESTICIDE
FOR MOSQUITO CONTROL
WILLISTON, NORTH DAKOTA

Reviewed by:

Recommended for Approval by:

Recommended for Approval by:

Approved by:

DATE:

SUMMARY

This Environmental Assessment (EA) addresses the aerial control of mosquitoes at Army Corps of Engineers property near Williston, North Dakota (ND) to include the City of Williston and surrounding County lands. The EA is prepared in compliance with the National Environmental Policy Act of 1969, as amended, and in acceptance with: Title 40, CFR Part 1500-1508, Council on Environmental Quality; DoD Instruction 4150.7, 32 CFR Part 989, DoD Pest Management Program; and AFI 32-1074, Aerial Application of Pesticides.

Surveillance results indicate that mosquito species present at Williston and the adjoining flood plain of the Missouri River are capable of transmitting serious human diseases. Mosquito populations are large enough, at certain times, to cause human pain, discomfort, and stress. In extreme cases they may seriously affect the performance of outdoor work activities, reduce recreational opportunities, and decrease the overall morale and quality of life within the infested area.

Two alternatives are eliminated from detailed studies because they do not meet project objectives, are not feasible, or involve a geographic area where jurisdictional government coordination and agreements had not been established. The four alternatives considered are:

1. No action
2. Enhance only biological and biorational control measures and encourage the use of personnel protective measures. Larvaciding is widely considered biorational or biocontrol measures since the endotoxins are produced by a bacterium.
3. Conduct aerial larval control using *Bacillus thuringiensis var. israelensis* (*B.t.i.*), limited to the floodplain and small areas of irrigated farmland directly adjacent to it (If allowed by landowners) and not to exceed 3 applications per season.
4. Conduct aerial larval control using *B.t.i.* on the floodplain, and aerial adult mosquito control using Anvil® on the city of Williston and adjacent occupied areas to the west, north, and east in order to create a buffer to mosquito activity. Applications would not exceed three treatments per season, except under medical emergency conditions.

The environmental consequences of each alternative are discussed in relation to identified major issues and concerns associated with the aerial application of pesticides. Environmental, health, and safety risks associated with the proposed alternatives are discussed. Mitigating measures that address specific concerns are offered. Selection of the preferred alternative, number 4 **will be** addressed in the Finding of No Significant Impact (FONSI).

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SECTION 1. PURPOSE AND NEED FOR ACTION

1.1. Introduction

Williston, ND is located within the Missouri Coteau, a transition zone between the Central Lowlands and the Great Plains physiographic regions. It is characterized by a rolling to hilly land with both erosional and glacial landforms (Bluemle, 1989).

The riparian area contains many shallow undrained depressions providing extensive mosquito-breeding habitat. This, in conjunction with present day human land use, creates a situation where the human and mosquito populations frequently interface.

Several species of mosquitoes which breed in the Williston area are capable of transmitting diseases, especially those diseases belonging to the viral encephalitides group (see Para 2.2). If a disease outbreak of this type were to occur, human health consequences would be severe, particularly among children and senior citizens, because post-exposure vaccines do not exist for treatment of such viral diseases.

Large mosquito populations can cause human pain, discomfort, and stress. Law enforcement personnel, fire department crews, city employees, and others who work outdoors may be adversely affected when the mosquito population is high. While each individual's predisposition to mosquito bites varies, morale and productivity are generally adversely impacted during periods of high mosquito activity. Adverse psychological reactions can be a factor in some individuals. Intense mosquito activity causes a decline in the utilization of outdoor recreation facilities such as golf courses, athletic fields, playgrounds, and picnic areas. The overall effect of this decline can result in reduced commerce and negative morale of the citizens living in the Williston area.

Mosquito populations can be reduced by the application of microbial and chemical insecticides. The aerial application of these materials, when done with care has proven to be an effective means to reduce mosquito populations of certain species, over a broad area.

1.2. Decisions to be made

The decision to make aerial applications over the prescribed areas on a given date will be made in concert with the Army Corps of Engineers (ACE), Williston Vector Control District (WVCD), and the Air Force Spray Flight (AFSF). Other agencies will be consulted for individual application as is appropriate. A variety of factors will be considered for each application including pest population densities, time of the year, weather, and aircraft availability. After gathering information from all agencies the ACE is responsible for officially requesting an

application with the AFSF. The official who is responsible for making this decision is Jeff Keller, U.S. Army Corps of Engineers.

1.3. Relationship to other decisions

This proposed action should be considered within the context of any other integrated pest management (IPM) activities directed toward mosquitoes in Williston.

The decision to include adulticiding treatments over the city of Williston is contingent upon adult mosquito populations during the designated dates (late May/early Jun).

1.4. Project objectives

The primary objective of this project is to reduce the potential threat of human disease to Williston and surrounding areas caused by mosquitoes through intervention in the transmission cycle of these vectors.

The secondary objective of this project is to reduce mosquito-induced discomfort, annoyance, and distraction experienced by residents being outdoors, either for work or participating in recreational activities.

An added benefit of this proposed project, although not a primary objective, is to reduce the potential threat of disease to domestic animals in the Williston area. This would include stabled horses [e.g., eastern equine encephalomyelitis (EEE) virus and West Nile Virus (WNV)], dogs (e.g., dog heartworm), and domestic fowl (e.g., EEE). This can have an indirect effect on the achievement of the primary objective due to the interrelating role that human and non-human animal hosts play within an arthropod-borne disease cycle.

1.5. Issues and Concerns

Issues and concerns were presented during discussions with city, county, state, and federal officials as well as Williston residents. The key issues and concerns are:

1. Are there health risks associated with exposure to the treatment material?
2. Will the treatment material affect water supplies and garden crops?
3. Will the treatment affect pets and livestock?
4. How will the treatment affect beneficial insects, aquatic organisms, and wildlife?
5. Will the treatment affect endangered or threatened species?

Pertinent information relating to these issues and concerns is presented in Section 5 ENVIRONMENTAL CONSEQUENCES.

SECTION 2. DESCRIPTION OF PROPOSED ACTION

2.1. Treatment site and acreage

The proposed area to be validated for aerial application is the city of Williston and the adjacent floodplain of the Missouri River just to the south of the city and running west to east (Appendix A).

2.2. Mosquito target species

Primary target species to be controlled are *Aedes vexans*, *Ochlerotatus dorsalis*, *Culex tarsalis*, and *Culiseta inornata*. Both *Aedes vexans* and *Ochlerotatus dorsalis* breed freely and abundantly on the floodplain in the standing water left after the spring rise. *Culex tarsalis* and *Culiseta inornata* breed in the wetlands in and around the city, however *Culex tarsalis* also uses ditches, storm drains, and artificial containers.

Several efficient mosquito vectors of encephalitis are present in the proposed treatment area. *Aedes vexans* is a secondary vector of EEE. *Culiseta inornata* is a vector of WEE. *Culex tarsalis* is the main vector of Western Equine Encephalitis (WEE) and can also vector St. Louis Encephalitis (SLE). Human cases of WEE and SLE have historically occurred in ND. During 1975, 41 WEE cases and 12 SLE were confirmed in ND. Since 1975, 15 cases of WEE and 2 cases of SLE have been reported from the state. During 1987, over 40 SLE and WEE virus isolates were made from pools of *Culex tarsalis* in ND. West Nile virus (WNV) is closely related to SLE and is primary transmitted by *Cx. tarsalis* in ND (US Army, 2001). In 2003, the ND Department of Health reported 617 cases of WNV infections and 5 deaths in the entire state.

2.3. Biological evaluations and decision making criteria

Aerial spray determinations will be based upon the mosquito population potential as influenced by environmental and climatic conditions (e.g., snow melts and rainfall along with the temperature affecting the mosquito brood hatch), actual mosquito surveillance (light trap counts, larval dipping, landing rates), and human complaints. Representatives from the following organizations have been and will be consulted to determine the need for spraying:

Youngstown Air Reserve Station
(Air Force Spray Flight, 757 AS/DOS; Entomologist)

US Army Corps of Engineers
(Natural Resource Manager)

US Fish and Wildlife Service
(Environmental Contaminant Specialist)

North Dakota Department of Health
(Senior Scientist)

North Dakota Game and Fish Department
(Wildlife Resource Management Supervisor)

North Dakota Game and Fish Department
(Northwest District Fisheries Supervisor)

Williston Area Vector Control District
(Director)

Communication between organizations is through formal meetings and through informal telephone contact as well as email. Pertinent biological information (light trap counts and larval dipping) is collected daily and exchanged weekly (local media) during the mosquito season. The decision to treat is a collective process derived by using IPM principles and meeting all the evaluation criteria, including minimal mosquito surveillance thresholds (larval, adult light traps, adult landing rates) as set forth in paragraphs 2.3.1.2 – 2.3.1.4 and Table 2.3-1. A consensus recommendation involving all organizations is then passed on to the appropriate Air Force Officials in charge of the application.

2.3.1. Factors determining if and when to treat

2.3.1.1. Disease Surveillance

Responsible Organizations: The primary mosquito surveillance efforts will be conducted by WVCD. Mosquito-borne disease will be monitored by the Williston Health Department representative and through regular contact with the North Dakota Department of Health (NDDH). Reporting of horse WEE and WNV cases takes place through the Veterinary Community and NDDH. Evidence of viral activity, as demonstrated by horse cases, is an important indication that a human threat may exist and that spraying is warranted. It should be noted from a surveillance standpoint, that widespread vaccinations of horses could mask this group as a disease risk indicator.

Arthropod-borne viral surveillance using caged sentinel fowl, wild birds (with appropriate permits), or viral assays of mosquitoes is not currently being done in Williston, nor routinely in the state of ND. This is a programmatic shortcoming, for these methods can detect local viral activity prior to the advent of human cases. In lieu of this information, a consensus of all the representatives having disease surveillance/health responsibilities must agree that a potential mosquito-borne disease threat exists. Such methods will be adopted in the future if funding and manpower becomes available.

2.3.1.2. Mosquito Forecasts

Responsible Organizations: Williston Vector Control District will be the primary organization responsible for predicting mosquito population densities. A major basis for treatment timing involves predicting adult emergence of the mosquito species, *Aedes vexans*, *Ochlerotatus dorsalis*, *Culex tarsalis*, and *Culiseta inornata*. WVCD will monitor larval populations of pest species to determine the timing of larvicides applications. *Aedes* species in the egg stage may remain viable for several years. *Aedes* and *Ochlerotatus* mosquitoes are strong fliers and commonly fly 10 miles, or more, from their breeding places for a blood meal. The development time for *Culex tarsalis* is as short as one to two weeks from egg to adult when average temperatures are near 80

degrees F in July. The ideal larvicide treatment window is while the larvae are still feeding, generally the end of May through June, in order to break the cycle of future mosquito activity.

2.3.1.3. Adult Mosquito Surveillance

Responsible Organizations: Williston Area Vector Control uses seven New Jersey Light Traps, which are operated daily through the mosquito season. Recommended treatment threshold values are presented in Table 2.3-1.

Landing rates are determined by counting the number of biting mosquitoes that are attracted to a Vector Control employee or volunteer, during a set time and at a set location. A count of 25 landing mosquitoes per minute observed within a marsh or floodplain mosquito breeding habitat, is used as a minimum level that must be achieved for nuisance control, prior to the recommendation for aerial treatment (See Table 2.3-1). To put this level of mosquito nuisance biting into perspective, Morris, et al. (1988) reports that, on the average, people feel there is a “bad” mosquito problem if they receive one attack about every minute.

2.3.1.4. Larval Surveillance

Responsible Organizations: Williston Vector Control. Larval dipping is used to evaluate mosquito populations, to varying degrees. As a minimum, larval dipping can confirm the presence of mosquito species in a given area. Williston Area Vector Control uses the average minimum threshold level of 25 larvae per dip before aerial treatment is requested for nuisance control (see 2.3.1.2 above and Table 2.3-1). Evaluating container breeding mosquito populations by dipping tires and other artificial containers is done sporadically.

2.3.1.5. Human Complaints

Responsible Organizations: Vector Control and the Vector Control Board of Directors. The Vector Control Board and Vector Control routinely monitor complaints of biting mosquitoes. Although subjective in nature, complaints are used as indication of building mosquito populations (See Table 2.3-1).

Table 2.3-1 Decision Matrix For Aerial Mosquito Control

City Of Williston and Adjacent Areas, 2009

Survey Methods and Treatment Goals:	Minimum Threshold Levels Required for Action	
Marsh/Floodplain Larval Counts	For aerial larval control sample 1 to 3 days prior to proposed spray date (80% - 1 st thru 3 rd instars)	For aerial adult control sample 3 to 7 days prior to proposed spray date (80% - 4 th instar and pupae)
Immediate goal:		
Disease Vector Control	5/dip	5/dip
Nuisance Control	25/dip	20/dip
Long-term goal:		
Egg Base Reduction (subsequent generations)	5/dip	5/dip
	For Aerial Adult Control Peak Rates Within 6 Days of Proposed Treatment	
Adult Landing Rates	In Marsh/Floodplain	Within City Limits
Immediate goal		
Disease Vector Control	5/minute	1/minute
Nuisance Control	25/minute	5/minute
Long-term goal:		
Egg Base Reduction (subsequent generations)	5/minute	1/minute
	For Aerial Adult Control Peak Rates Within 5 Days of Proposed Treatment	
Light Trap Counts		
New Jersey Light Traps	Marsh/Floodplain Sites Trap Index*	Inner City Sites trap Index
Immediate Goal:		
Disease Vector Control	20 females	15 females
Nuisance Control	75 females	35 females
Long term goal		
Egg Base Reduction (subsequent generations)	25 females	5 females
*Number of collected females/(# traps x # nights)		
Complaints	These are obtained from city residents as well as city, county, and state employees. They include law enforcement officials, city parks workers, employees of the State Game and Fish Department as well as the Army Corps of Engineers and private citizens. Many of these complaints are called in on the Vector Control Comment Line but some come through officials such as the Mayor or City and County Commissioners. Key people will be solicited to comment on mosquito activity 1 to 3 days prior to an aerial spray. Criteria shall be that these people consider mosquito populations to be moderate to heavy which, in turn, adversely affects their ability to conduct outdoor activities.	
Footnotes and Comment		
This matrix applies to the City of Williston, ND surveillance and Vector Control activities. On the proposed day of adult spraying, a low larval count is expected because adults have already emerged. Larval counts can project		

adult populations and approximate time of peak adult emergence.

On the proposed day of adult spraying, adult emergence should have peaked. Counts should be high or on the decrease as female mosquitoes leave the marshes and floodplain seeking blood meals. Landing rates are not used to validate the need for larval control. When fresh-water breeding adult mosquito activity is greatest, only measurements within the city are useful.

When mosquito populations are judged to be a disease vector problem, their numbers may be below nuisance levels.

On the day of treatment, marsh-dwelling mosquitoes may not yet be a humanly perceived problem if they have not yet migrated away from the marshes.

On the day of aerial spraying, peak numbers may not be reached because marsh mosquitoes have just emerged and have not yet migrated to light trap locations. Prior to spraying there should be some indication that mosquito populations are building. For fresh-water breeding mosquitoes, the light trap is the primary surveillance method used to initiate and terminate adult mosquito control efforts, both aerial and ground based. It should be noted that trap catches are affected by environmental influences such as temperature, wind, rain, and moon phase.

Comment: All sampling methods provide a relative index of a biological population that is subject to wide swings in variation. All numbers listed above should be evaluated with a plus or minus 20% variation. Most importantly sampling data should indicate trends, specifically increasing populations and peak activity. The North Dakota Department of Health would be the primary basis for classifying mosquitoes as a disease vector problem and using lower threshold limits.

2.4. Treatment method

The treatment aircraft would be a C-130H specially outfitted for aerial spray application with a Modular Aerial Spray System (MASS) provided and staffed by specifically trained and certified personnel from the US Air Force Reserve (USAFR) – Youngstown Air Reserve Station, Vienna, Ohio.

Overflights of spray aircraft would be at an elevation of 100 to 1000 feet. The spray operations would concentrate on periods of high mosquito activity for adult control measures and periods of high humidity for larvicide applications. The most common profile flown for adult mosquito control begins one to two hours before sunset if weather permits. This is generally when mosquito activity (biting/feeding) is greatest and weather conditions (wind and humidity) are most favorable for insecticide applications. Additionally, some applications may be made after dark. Larvicide applications will be conducted during the morning hours immediately following sunrise which correspond with favorable environmental conditions.

2.5. TREATMENT MATERIALS

The microbial larvicide *B.t.i.*, is derived from naturally occurring bacteria that form an endospore toxic to some insect species (e.g., aquatic flies) and is formulated for aerial applications over wetlands to control larval mosquitoes. One example of a commercially available formulation of *B.t.i.* is Vectobac® 12ASTM2 [EPA Reg. No. 275-66, 1.2%B.t.i., Serotype H-14, 1,200 International Toxic Units (ITU) per milligram and 98.8% inert ingredients]. Recommended application rate for Vectobac® 12AS is .25-2 pts/acre in conditions similar to that found along the floodplain near Williston (high organic content of water, heavy vegetative cover).

Altosid® contains Methoprene, 1-Methylethyl(E,E)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate, an insect growth regulator (IGR) is used for aerial spraying to prevent mosquitoes and blackflies from developing out of the pupal stage (EPA, 2001). Methoprene degrades rapidly in sunlight, both in water and on inert surfaces. Methoprene is also metabolized rapidly in the soil and does not leach so it is not expected to persist in soil or contaminate ground water.. The formulation contains 1.72 lb/gal (205.2 g/l) and the recommended application rate is 0.75-1.0 oz per acre.

Anvil® 10 + 10 TM29 . NSN 01-474-7751, EPA registration number 1021-1688-8329, 10 % Sumithrin, 10% Piperonyl butoxide. Recommended for aerial ULV applications at .21 to .62 fluid ounces per acre.

Trumpet® (Environmental Protection Agency (EPA) Reg. No. 59639-90-5481), a formulation of 78% Naled (1,2-dibromo-2,2-dichloroethyl dimethyl phosphite) with 22% inert ingredients is recommended in aerial application for adult mosquito control. The recommended aerial ultra-low-volume (ULV) application rate is 0.6 to 1.2 fluid ounces of undiluted Trumpet per acre. Trumpet EC is a special formulation intended for use only in its undiluted form and can be flushed with water.

See Appendix B and Appendix C for product labels and Material Safety Data Sheets.

Vectobac® is a registered trademark of Abbot Laboratories, North Chicago, IL

Altosid® is a registered trademark of Wellmark (Zoecon) International, Schaumburg, IL

Anvil® is a registered trademark of Clarke Mosquito Control Products, Inc., Roselle, IL

Naled® is a registered trademark of Amvac Chemical Corp., Newport Beach, CA

SECTION 3. ALTERNATIVES CONSIDERED

3.1. PROCESS USED TO FORMULATE ALTERNATIVES

Best pest management practices and industry-accepted methodologies were considered in the formulation of alternatives. The presence of appropriate mosquito breeding habitat and consideration of reasonable mosquito flight ranges were used as criteria to delineate the proposed treatment boundaries. Limits on the frequency of treatments, which are stipulated in some alternatives, are based upon historical and biological need.

3.2. ALTERNATIVES ELIMINATED FROM DETAILED STUDIES

Two alternatives were eliminated from further study during the assessment process because they either did not meet project objectives or were not feasible for other reasons.

They are:

1. Conduct ground-based chemical insecticide treatment over entire proposed treatment area.

This alternative would be physically and economically impossible, given the total acreage proposed for treatment and the inaccessibility of the majority of the wetlands to ground equipment. In addition, ground application has limited application range and requires a greater amount of active ingredient per given treatment area. Ground applications (fogging and resting-site barrier treatments) are already a part of the Williston Area Vector Control's program for selective treatment within the city limits and on the perimeter of mosquito breeding sites. Fogging operations are based upon mosquito trap counts and complaints.

2. Mechanically manipulate marsh/floodplain-breeding areas through drainage or open marsh management activities.

Although an effective way of eliminating mosquitoes at their source, draining or altering wetlands, other than those areas that are already covered by permits to maintain existing mosquito and drainage control ditches, risks violation of Section 404 of the Clean Water Act. Creation of ditches and ponds can permanently negatively impact marshland hydrology and vegetation ecology.

3.3. DESCRIPTION OF ALTERNATIVES CONSIDERED

3.3.1. Alternative 1: No Action

Under this scenario, no action to control mosquitoes would take place, other than measures presently used by Williston Area Vector Control as part of their routine pest management program (e.g., ground fogging based upon adult mosquito trap counts and complaints, reducing container breeding sources, selective breeding pool larvaciding, and barrier treatments. Mosquito population levels would only be influenced by these and natural forces.

3.3.2. Alternative 2: Enhance only biological and biorational control measures and encourage the use of personal protective measures

Examples of biological control measures include: stocking mosquito breeding ponds with mosquito breeding fish (e.g., *Gambusia affinis*), erecting nesting boxes for insectivorous purple martins, ground-treating breeding sites with a biological control agent (e.g., *B.t.i.*), and eliminating container and non-wetland breeding habitat/conditions. Personal protective measures include using repellents, wearing protective clothing, and avoiding the outdoors during peak mosquito biting periods.

3.3.3. Alternative 3: Conduct aerial larval control using *B.t.i.* on the floodplain adjacent to the city of Williston and not to exceed three applications per season

Only contiguous wet areas having appropriate breeding habitat can be treated using the available aerial spray equipment. Three applications (or less) are stipulated to minimize disruption of wetland ecosystems. Larval stages of mosquito species that breed in containers, small pond/puddles, treeholes, and ponds covered by dense foliage would not be treatable under this alternative.

3.3.4. Alternative 4: “Preferred Alternative”. Conduct aerial larval control using *B.t.i.*, or biologically similar agent, and aerial adult mosquito control using Anvil®, on the city of Williston and adjacent housing developments. Applications of each material would not exceed three treatments per season, except under medical emergency conditions

These control measures would be limited to the Williston city limits and the vector control district, as well as the Missouri River floodplain south of the city. Three applications (or less) are stipulated to minimize disruption of wetland ecosystems and excessive pesticide burden on non-target organisms. More frequent adulticide treatments would also increase the risk of development of pesticide resistance in the target mosquitoes. In a typical season, one adulticide treatment is needed in late spring to kill the first major mosquito brood (late May early June), one to target a major mid-summer brood (June-July), and one treatment is directed toward suppressing the late season (August) brood which, in turn, reduces the over-wintering egg base. This then reduces the following year’s spring brood. A medical emergency necessitating consideration of more than three treatments would consist of compelling evidence of human illness due to a locally-contracted mosquito-borne disease.

SECTION 4. AFFECTED ENVIRONMENT

4.1. GEOMORPHOLOGY AND PHYSIOGRAPHY

The city of Williston is located at Latitude 48.16 N, Longitude 103.63 W. The elevation is 1,882 and is comprised of some 4,500 acres. The city and surrounding area is characterized by rolling hills and hummocks containing many springs, creeks, ponds and wetlands. The creeks (or coulees) all eventually drain into either the Missouri or Muddy Rivers. Some areas around the springs stay in a saturated state throughout the year as are many of the ponds located along the creeks.

4.2. LAND USE

Much of the surrounding countryside is given over to farming and ranching, some of this being irrigated acreages. Oil exploration is becoming a more prevalent use in the area as more wells were activated after 2006. Because of this a good deal of the city is zoned for heavy industry and there has been a construction boom to alleviate the housing shortage. Outdoor recreational facilities in the area include a number of city parks, golf courses and playgrounds. Outside the city are a State Park, Two Corps land parks (Legion and Trenton Lake), the Confluence Center and Fort Buford run by the State Historical Society, and a waterfowl production area (Lewis and Clark) managed by a partnership between the State Game and Fish Department and Ducks Unlimited.

Bee keepers in Area – See Appendix D below

4.3. METEOROLOGICAL AND CLIMATOLOGICAL SETTING

Williston has a dry continental climate, with frequent and drastic weather changes. Winters are often long and severe while the summers are generally short and dry. Spring & fall are characteristically short transition periods between winter and summer. Average temperatures range from low 70'sF in the summer to 10F in the winter. Average annual precipitation is between 13 and 14 inches, much of that coming in the summer months (Country Studies). Humidity levels often fluctuate by 30% or more between mornings and afternoons in the summer and average wind speeds range from 10 to 12 mph throughout the year.

4.4. DEMOGRAPHICS

The population of Williams County was 12,393 in July of 2007, principally in the city of Williston itself. This figure has grown substantially since 2008 due in large part to the oil industry. The population density of Williston is around 1,800 people per square mile which is considered low by national standards. The people are primarily of Norwegian and German ancestry. Construction and mining (oil) are significant employers in this region along with agriculture. Tourism through the area has increased in past years due in part from the opening of the Confluence Center and improved camping facilities.

4.5. NONTARGET ORGANISMS

From a broad perspective, non-target organisms within the proposed treatment area include: the resident human population, domestic animals (e.g., dogs, cats, horses); woodland mammals (e.g., white-tailed and mule deer, moose, cougar, hares, skunks, fox, beaver, and muskrat); game and non-game bird species (e.g., songbirds, ducks, geese, and hawks); freshwater fish (e.g., pike, walleye, sturgeon, paddlefish, catfish, and carp) reptiles and amphibians; and many terrestrial and aquatic invertebrates (e.g., insects and crustacea).

Non-target plants include many naturally occurring native plants as well as some irrigated crops. The floodplain is characterized by mixed deciduous forest (e.g., willow, ash, elm, cottonwood, and box elder); interspersed with large areas of riparian vegetation (e.g., bulrush, cattail, sedge, smartweed, and cord grass); elevated sites support a mixed northern plains grassland community (e.g., little bluestem, western wheat, and blue grama); aquatic species include duckweed, and *myriophyllum*. Irrigated crops are primarily an alfalfa/bromegrass (forage) mix that is cut and harvested one to three times a year.

The target organisms in this project are the adult and larval stages of mammal-feeding mosquitoes (family Culicidae). The most likely group of non-target organisms that would be potentially affected by the proposed adulticide treatment would be other insects. Flying insects, exposed at the time of application, especially those of similar class size to mosquitoes such as midges, gnats, and marsh flies may be killed upon direct contact with the adulticide spray material. Bees, while larger than mosquitoes, are susceptible to permethrin and sumithrin and can be affected adversely. Dragonflies and damselflies (*Odonata*) are normally not affected by the average sized droplets used in ULV sprays. The larvicide suggested for this program is a narrow spectrum pesticide that has minimal non-target affects. Some non-culicid *Diptera* (true flies, midges) with aquatic life forms would likely be affected by ingestion of the *B.t.i.* larvicide.

Further information relating to non-target organisms and precautionary steps taken to protect them may be found in Section 5, Environmental Consequences.

4.6. THREATENED/ENDANGERED SPECIES

According to the US Fish and Wildlife Service, Bismarck, ND office and the ND Natural Heritage Inventory, there are two threatened and two endangered species found in the proposed treatment area. The Bald Eagle (*Haliaeetus leucocephalus*) and the Piping Plover (*Charadrius melodus*) are on the threatened list, while the Least Tern (*Sterna antillarum*) and Pallid Sturgeon (*Scaphirhynchus albus*) are endangered species.

SECTION 5. ENVIRONMENTAL CONSEQUENCES

5.1. BIOLOGICAL AND PHYSICAL CONSEQUENCES BY ALTERNATIVE

5.1.1. Alternative 1 – No Action

Under these circumstances any concerns about the aerial application of the insecticides and the effects that may result from such treatment on the environment would be eliminated. Non-target insects, particularly other Diptera and Hymenoptera (e.g., Honeybees), would not be affected. Large-scale intervention in a potential mosquito-borne disease cycle would not take place. A noticeable decline in mosquito populations, especially *Aedes vexans*, and a noticeable reduction in mosquito biting annoyance levels to the human population, other than those that might occur naturally, would not be realized. The late-fall egg base of *Culex tarsalis* and *Aedes vexans* would not be reduced which typically results in a large emergence in the spring of the following year.

5.1.2. Alternative 2 – Enhance only biological and biorational control measures and increase emphasis on personal protective measures.

Reducing artificial container-breeding habitat (cleaning up waste tires, cans, water-holding refuse; changing water in bird baths) and using a ground applied (e.g., by hand) biological control agent such as *B.t.i.*, would help to reduce the numbers of several species of biting mosquitoes. Source reduction would not have impact on *Aedes vexans*, *Ochlerotatus dorsalis* and ground-based application of a biological control agent to floodplain habitat would be limited, due to physical inaccessibility.

Colonization at other pools by larvivorous fishes (e.g., mosquito fish; *Gambusia affinis*, killifish; *Fundulus* sp.) would likely help to reduce mosquito numbers. Some mosquito species breed in habitats that are unsuitable for the introduction of such fish (e.g., artificial or temporary water sources) and would not be affected. Also, attention must be paid in using only endogenous fish species because negative environmental effects on native fish and vegetation may result from introducing non-local fish (Haas, 1984).

Insectivorous animals such as bats and birds can be encouraged to proliferate in given vicinities by erecting suitable nesting structures. Purple Martins (*Progne subis*), a bird that consumes mosquitoes (and other insects) on the wing, is one popular example. Anecdotal claims are often made of the large quantity of mosquitoes eaten by this species, but quantifiable evidence of mosquito population reductions, which are attributable to this species, is lacking. It should be noted that their diet also consists of neutral or even beneficial insects, such as wasps and dragonflies.

By increasing/enforcing personal protective measures, the individual risk of contracting a mosquito-borne disease as well as mosquito biting annoyance are reduced. Difficulties relating to the issues of practicality and convenience arise when trying to encourage the residents to practice preventive measures such as curtailing outdoor activities, wearing long sleeves and long pants during hot outdoor temperatures, and being judicious in the application of repellent. Varying strengths and formulations of DEET (N,N-Diethyl-m-toluamide), an effective mosquito repellent, are available commercially.

5.1.3. Alternative 3 – Conduct only aerial larval control using *B.t.i.*, limited to the floodplain and not to exceed three treatments per season.

Interruption in a potential mosquito-borne disease cycle would take place. The physical pain and mental anguish associated with massive attacks by *Aedes vexans*, *Ochlerotatus dorsalis*, and other painful biting species would be reduced for the residents of Williston and surrounding areas. Increased productivity involving outdoor work and enhanced recreational enjoyment would also be experienced in this area. All biting species of mosquitoes would not be eliminated, because of the discreet and untreatable breeding habitats of some. Migration of adult biting mosquitoes into the Williston area from vast untreated areas up and down the river would still be expected.

Contiguous marsh, wetlands and flooded areas would be targeted for treatment. First through fourth instar mosquito larvae of fresh and marsh mosquitoes, particularly *Aedes vexans* and *Ochlerotatus dorsalis* would succumb within 24 hours of ingesting the *B.t.i.* proteinaceous parasporal particle. Some immature stages of midges (e.g., *Chironomus* spp. and *Dixa* spp.) would also be killed upon ingestion of the material. The persistence of *B.t.i.* activity is usually no more than two days under typical mosquito abatement use conditions, so the effect on non-target midge populations would be temporary.

Application over human populated areas and residences would be minimal. Associated human disturbance due to temporary noise from low-flying aircraft would be minimal. A treatment window broader than 2 hours before sunset or 2 hours after sunrise could be used, if needed, and if climatological conditions permit. Wild or cultivated bee colonies would not be affected and notification of beekeepers, therefore, would not be mandatory. No adult non-target insects and only a few species of non-target subadult diptera would be affected. The proposed limit of no more than three applications per season would allow populations of the small number of affected non-target taxa to recover. The recommended *B.t.i.* formulations would not affect painted surfaces such as vehicle finishes.

Ground-based chemical control would be curtailed once existing adult mosquitoes died off and the effects of larval control on trap catches could be seen.

5.1.4. Alternative 4 – Conduct aerial larval control using *B.t.i.* limited to the floodplain, and aerial adult mosquito control limited to the city of Williston and immediate surrounding area but excluding the floodplain, using Anvil®. Applications of each material would not exceed three treatments per season, except under medical emergency conditions.

Many of the environmental consequences relating directly to the use of *B.t.i.* would be the same as in Alternative 3. The human benefit in terms of relief from biting mosquitoes and intervention in a potential disease cycle, would be enhanced, because a broader spectrum of biting species would be killed, not just ones originating from treated floodplain and fresh water larval sites. Migration of adult biting mosquitoes into the city of Williston from nearby untreated areas would still be expected.

Application over human populated areas and residences within the city would occur. City residents would experience associated human disturbance due to temporary noise from low-flying aircraft. A treatment window of 2 hours around sunset and 2 hours around sunrise would be adhered to for the application of Anvil®.

In addition to larval mosquitoes killed by *B.t.i.*, and adult flying and resting mosquitoes that are controlled by Anvil®, some mortality may be seen in bees, wasps, flies, dragonflies, damselflies, butterflies, and moths, which come into contact with Anvil®. This would include neutral or beneficial species as well as pest species. An added control benefit would be seen in the control of non-target pest species such as; biting midges, deer flies, horse flies, stable flies, black flies, and filth flies. Bees foraging within the city limits at the time of application would be killed. Beekeepers living near the city would be notified by Vector Control to take protective measures prior to treatment (see Para 5.9.4).

Generally, any small insect directly exposed to Anvil® during the application process would be susceptible. Hidden/protected terrestrial and aquatic insects would, for the most part, remain unharmed due to the rapid degradability and non-residual nature of Anvil®. It is not anticipated that insectivorous predators (e.g., insectivorous birds) would be negatively impacted, due to the continued availability of unaffected insect prey.

After successful aerial treatment, trap catches would be carefully monitored to ascertain the need, if any, and kind of ground-based control measures to be taken. Any negative environmental effects normally resulting from ground treatments (e.g., effects on non-target organisms) would continue for the duration of such control measures.

A greater number of non-target organisms would be potentially affected by this alternative. Foraging bees and bees in unprotected beehives could be killed. Bee mortality can be mitigated by covering bee hives the day of the application so they cannot forage. Application are done near or after sunset which reduces non-target insect mortality.

5.2. CONSEQUENCES RELATING TO HUMAN HEALTH AND SAFETY

Bacillus thuringiensis is generally considered to cause no threat to human health. In almost 30 years of *Bacillus thuringiensis* (*B.t.*) use, there have been no scientifically documented cases or evidence of *B.t.*-caused illness directly attributed to forestry or mosquito control use situations, under normal application conditions and at recommended label rates. This is of particular note considering its widespread use for gypsy moth suppression in highly populated suburban areas. There is only one published study purported as evidence that *Bacillus thuringiensis* Lepidoptera specific strain (*B.t.k.*) is pathogenic to humans. This involved an eye ulcer from material splashed into the eye of a farm worker (USDA 1995; USEPA 1986). However, the Centers for Disease Control (CDC) feels, from an epidemiological standpoint, there is no need to curtail the use of *B.t.i.*, as a result of this accident.

Based upon EPA's scientific findings (EPA 1990), no data gaps exist for *B.t.i.* and there are no substantial human safety concerns and no evidence that *B.t.i.* poses a health risk via the oral route of exposure. In summary, *B.t.i.* is likely one of the least hazardous pesticides in use today.

Methoprene, or Altosid® is an insect juvenile hormone and has not been shown to be harmful to humans. Direct contact can cause mild eye and skin irritation, but no known serious health effects have been found. The EPA requires registrants of products used against public health pests to demonstrate that the products meet specific standards for effectiveness as well as for safety. The pesticide products currently registered for methoprene for use against public health pests have met these stringent standards (EPA 2001). Methoprene has been placed by the EPA into the category of "least toxic" with regard to humans.

Sumithrin, or Anvil® is a pyrethroid-based pesticide registered for use in mosquito control by the EPA. It has low toxicity to humans, mammals, and the environment. In three decades of its use, there have been no reports of toxic effects of Anvil® to people, pregnant women, pets, or other mammals. In large concentrations (e.g., during the loading process) mild eye and skin irritation may occur with exposure to Anvil®, which can be treated by washing the eyes and skin thoroughly with water after contact. Pyrethroids can be used for public health mosquito control programs without posing unreasonable risk to human health when applied according to the label. Pyrethroids are considered to pose slight risks of acute toxicity to humans, but at high doses, pyrethroids can affect the nervous system so individuals loading the material use personal protection measures (EPA 2007). When applied as a ULV spray, around one half ounce per acre, the dosage would be less than a percent of this.

Dibrom®, like Anvil® at the rates applied would present only slight risks of acute toxicity to humans but the material can be a carcinogen at many times the label rates. It is possible, despite all precautions exercised that a member or members of the spray crew could be exposed from a spill or accidental discharge but this would not impact residents in the spray area.

Aerial application using the proposed aircraft has proven to be safe. No life threatening mishap or crash has occurred with the AFSF and proposed aircraft in any past spray operations.

5.3. CONSEQUENCES RELATING TO AIR QUALITY

The recommended ULV aerial application rate for Anvil® generates droplets of averaging around 53 microns across (about the width of a human hair). Depending on the climatological conditions, these droplets settle to the earth in a matter of 30 minutes at most. There would be temporary increases in volatile organic compounds within the proposed treatment area as a result of the proposed action (application rate not to exceed 0.62 oz/acre). However this activity would not exceed local standards for air emissions and would not result in nonconformance with the Clean Air Act and its amendments. It is recognized that humans and other vertebrates can inhale ULV sprays. Residents would be notified of spray timing, in order to minimize undue inhalation exposure. Careful attention would also be paid by the applicators to avoid drift into non-target areas (e.g., the floodplain).

The spray droplets of the wettable powder formulation of *B.t.i.*, at the rate of 6-12 ounces in ¼ to 10 gallons of water per acre would settle to the water surface within minutes of the application, and would, therefore, only transiently affect the quality of the immediate airspace.

In summary, the aerial spraying of Anvil® and *B.t.i.* would only temporarily affect the local air quality. All of these materials settle to the ground, water, or vegetative substrate, within hours, where they begin to biodegrade and hydrolyze.

5.4. CONSEQUENCES RELATING TO WATER QUALITY

In the proposed concentration, Anvil® or Dibrom® would have no impact on the water quality of the area. The application of these two products would be over the city only and not include the areas to be larvicided. Any possible drift over a water area would be so minute, hydrolysis and the short residual would render it harmless.

Although the *B.t.i.* active agent is stable in water for more than 30 days, it would gradually settle out and become enmeshed, embedded, or attached to bottom substrate. It may also be consumed by other aquatic organisms thereby being a food source providing protein without ill effects, according to one manufacturer (Biochem Products, undated). Water quality, would not, therefore, be negatively affected.

5.5. EFFECTS OF SOLID WASTE DISPOSAL

Anvil® containers would be triple rinsed with the designated spray carrier, rendered unusable, and disposed of in an approved landfill. Under no circumstances would the containers be used for any other purpose. The *B.t.i.* containers would be handled in the same way, unless the product label specifically allows recycling of this container. The *B.t.i.* rinsate would be added to the spray tank as a diluent. Any contaminated protective equipment would be handled as hazardous waste.

5.6. EFFECTS ON NOISE

The only source of noise associated with this proposed action would be that caused by the low level flying of aircraft during pesticide application. The noise levels generated by a C-130H aircraft flying at 200 feet have been evaluated using the US Army Center for Health Promotion and Preventative Medicine's NOISESLICE computer program. The predicted noise from the proposed aerial spray operations was measured using a parameter called an A-weighted Day Night Level (ADNL), which closely resembles the frequency response of human hearing and, therefore, provides a good indication of the impact of noise produced by transportation activities.

Values of 50.6 decibels A-weighted (dBA) for one overflight and 60.1 dBA for ten overflights, were calculated. These levels are determined to be compatible with noise-sensitive land uses and fall within Noise Zone I, as defined by the Department of Army's Installation Compatible Use Zone (ICUZ) Program. The Zones are defined as; Zone I – compatible (<65 dBA), Zone II – normally incompatible (65-75 dBA), and Zone III – incompatible (>75 dBA).

Although the magnitude of sound generated by a C-130H can appear great, the impact should be minimal due to the short duration of the noise exposure and since advance notice of the operation would be given city residents. Also, due to the prominence of the airport facility, Williston Airport, air traffic is commonplace in the vicinity and, therefore, a certain degree of acclimation exists among the vicinity's human and faunal populations.

5.7. FISH, WILDLIFE, AND OTHER NONTARGET CONSIDERATIONS

5.7.1. LARVICIDES *B.t.i.* AND ALTOSID

This particular microbial pesticide, *B.t.i.*, was chosen specifically because it is an exceptionally safe agent for non-target organisms, including man and other vertebrates.

Altosid risk assessments show that the concentrations of active ingredient in aquatic environments, if the product is used according to label directions, should be well below the levels that are harmful in laboratory toxicity tests.

5.7.1.1. FOOD CHAIN

A summary of safety tests on Vertebrate and invertebrate non-target organisms compiled by one *B.t.i.* manufacturer (Biochem Products, undated) show that, other than producing mortality in some species of flies and midges, no ill effects were detected in close to 100 different non-target invertebrates. Garcia (1980) obtained similar results. Additionally, if a yet-unknown non-target food species were to be negatively impacted, the food habits of rail species appear to be diverse. Examples of food items include; immature and adult insects, snails, crustaceans, mollusks, annelids, small amphibians, and fish. Finally, the proposed limit of no more than three applications per season would allow populations of the small number of affected non-target taxa to recover, something which otherwise might prove difficult under more frequent treatments.

Methoprene's disruption of the mosquito growth cycle allows it to be defined as a bio-rational agent, rather than a conventional pesticide. It specifically targets mosquito larvae, but does not kill them until they reach their next developmental stage, the pupae. This can be key to preserving the natural food chain, since mosquito larvae can be a minor food source for other organisms. In addition, extensive studies have shown that methoprene breaks down quickly in the environment, spares non-target organisms, and poses no hazards to humans.

5.7.1.2. RIPARIAN ECOSYSTEMS

A study examining the non-target effects of *B.t.i.* on stream invertebrates communities and fish (Merritt, 1989), found no significant effects. Another study (Lee, 1989) revealed that *B.t.i.* was less toxic to non-target fish (*Fundulus heteroclitus*) than four chemical larvicides. A point to consider when weighing the effects of reducing mosquito numbers in a marsh ecosystem is that competing non-target "non-pest" organisms can be expected to fill the ecological niche normally occupied by "pest" mosquito larvae and could, in some cases, benefit ecologically from intervention. As to methoprene, nothing dies until it reaches the pupal stage of development so everything is essentially left in the system.

5.7.1.3. STRAIN SPECIFICITY

Based upon EPA's scientific findings (EPA, 1990), data gaps do exist in the ecological effects database for *B.t.i.*, mainly relating to strain specificity. There are, however, no substantial environmental safety concerns and no substantive concerns regarding unreasonable adverse effects. Certain endangered *lepidopteran* (butterflies, skippers, moths) insect species can be affected by the *kurstaki* strain, but this strain differs from *dipteran*-specific *israelensis* strain and endangered *lepidopteran* species are not known to occur in the proposed treatment area.

There is no evidence to suggest that B.t.i. or Altosid are toxic to, or otherwise affects, honeybees or honeybee products.

5.7.2. ADULTICIDES ANVIL® AND DIBROM®

5.7.2.1. FIELD AND LABORATORY OBSERVATIONS

The application rates used for these two products and their method of delivery specifically target small flying insects to the point where the dosage causes negligible impact on larger insects. Bees however, are highly sensitive to both products and high losses in the *chironomid* populations would be expected.

5.7.2.2. PROTECTED SPECIES AND SENSITIVE AREAS

A reduction in adult mosquitoes/flying insect numbers due to treatment would have negligible impact on the ND ranked bird species in the proposed treatment area due to the type, diversity, and availability of organisms that they are known to feed upon. It should be noted that there are documented cases of some of these species nesting or brooding in or near the treatment area. The food items for these birds are summarized in the following table:

Table 5.7-1 Avian Food Preferences

Possible Migratory Bird Species	Documented Food
Endangered:	
Least Tern	small fish
Threatened:	
Piping Plover	insects, crustaceans, and mollusks
Bald Eagle	fish, waterfowl, other birds, small mammals, and carrion
Threatened, Endangered, and Candidate Bird Species food preferences (Grondahl, undated)	

The Pallid Sturgeon (*Scaphirhynchus albus*) is the only known endangered fish in the proposed treatment area. It is known that the young sturgeon feed on the *chironomid* larvae which are susceptible to *B.t.i.* Aquatic insects and fishes are important in the diet of juvenile pallid sturgeon in the Missouri River downstream from Fort Randall Dam (Wanner and Shuman, 2006).

5.7.2.3. Domestic Animals

Due to the short residual and the minute application rates of both of these products, domestic animals are highly unlikely to be affected in any way. Beekeepers have been and will be contacted before any adulticide applications take place and the timing of such applications would be when bees are in the hive rather than out foraging.

5.7.3. Summary

In summary, based upon currently available information, the proposed treatments of Anvil® and *B.t.i.* should not significantly impact wildlife and non-target organisms due to these materials' target specificity, mode of action, low persistence, rapid biodegradability, and limited numbers of applications. Actually, the preferred alternative could improve survivability in avian and mammalian spp. by removing the arbo-virus vectors. And since these materials would be applied well within the parameters of the allowed spectrum of applications, there would be minimal impact to non-target organisms.

5.8. OTHER CONSIDERATIONS

At the proposed rate of application, no evidence exists which suggests that *B.t.i.* or Anvil® would harm trees, plants or garden crops or that residues resulting from mosquito control would exceed established tolerances for raw agricultural commodities (EPA 1983, 1990). At the prescribed rate, no phytotoxic activity has been documented that would suggest harm to plants.

5.9. MITIGATING MEASURES THAT APPLY TO ALTERNATIVES

5.9.1. Aerial Application Precautionary Measures

Every effort would be made during the course of this project to conduct a safe and effective program. The operation would be announced to local residents via radio, television, and newspapers. Any spraying operation would involve certified aerial applicators that meet the required state and federal licensing standards. Certified personnel are required to inspect the aircraft and equipment prior to commencement of any spraying operation.

Radio communication would exist among observation/marketing personnel, the loading crew, and the spray aircraft. The spray plane pilot would be thoroughly familiar with the proposed treatment area including

potential aerial hazards, areas having application difficulties, and sensitive areas to avoid, prior to the spray flight.

Adult mosquito control applications would be conducted only when atmospheric conditions are as follows: winds less than 10 mph; low thermal activity; temperature ideally less than 80°F; humidity greater than 50%. As a precaution, application of *B.t.i.* and Anvil® should not take place within 5 days of each other, unless testing shows that there are no contraindicated effects of the two materials.

Program personnel would evaluate proper insecticide deposition and efficacy using spray deposit dye card and bioassay cages (i.e., caged mosquitoes). Additional numbers of mosquito light traps would be used, pre and post-treatment, to evaluate spray efficacy. All treatment area boundaries will be identified using GPS. Treatment areas that are not readily identified from the air would be marked on the ground using helium balloons. Finally, people residing within the spray area that have special concerns, such as beekeepers (Appendix D), and pesticide sensitive individuals, would be notified by Williston Area Vector Control before treatment occurs.

5.9.2. Environmental Precautionary Measures

It is recognized that Anvil® can be toxic to some species of fish, crustacea, and other aquatic invertebrates. Anvil® is also toxic to terrestrial invertebrates upon contact. All evidence indicates that populations can recover in short order due to Anvil®'s low persistence and degradability. As an added precaution, the number of sprays would be limited to no more than three per season, to further limit the pesticide burden, which may be experienced by the ecosystem. The only exception to this would be clear and compelling evidence of a mosquito-borne disease outbreak.

Spill containment and appropriate cleanup materials would be present at the pesticide storage site, during pesticide transport, and at the loading site, to prevent environmental contamination due to an accidental spill. Any rinse material used to clean spray equipment would be handled as hazardous material.

5.9.3. Human Health Precautionary Measures

All available means would be used to evaluate the potential local threat of mosquito-borne diseases. If such disease threats exist, the public would be notified, through all available means, of the appropriate measures and alternatives, which would be used to reduce such risks. If aerial treatment were involved, the public would be notified by print and electronic media with sufficient time to allow for planning to minimize exposure during pesticide application (see 9.2 below). Measures such as remaining indoors or making plans to be away from the treatment area during the application process can be taken.

The application would be timed so as not to coincide with school children being outdoors during the school year.

Operational exposure to the insecticide would, by far, have the highest degree of human exposure during this project. Stringent pesticide mixing and loading precautions and label directions would be followed to minimize human exposure to pesticides at the storage facility, during pesticide transport, and at the aircraft loading site. Impervious protective clothing, gloves, apron, overshoes, chemical goggles, face shields, and Mining Safety and Health Administration (MSHA)/National Institute of Occupational Safety and Health (NIOSH) approved respirators would always be used by workers handling the pesticides. All employees handling pesticides would have received hazard communication training and would have available to them labels and MSDS's for the pesticides used.

Pesticide would be transported from the storage site to the aircraft-loading site in vehicles that are equipped with spill containment and cleanup materials and with a separate cab and cargo section. The local hazardous material (HAZMAT) response teams would be contacted prior to and during the operation for HAZMAT contingency planning.

At the loading site, all valves, hoses, connections, pumps, and barrels would be inspected and maintained to prevent spillage and human exposure. For Anvil® loading, a vapor containment system will be utilized. DoD personnel certified in aerial application of pesticides would be present and supervise the mixing and loading of pesticide materials.

5.9.4. Beekeeper Precautionary Measures

Anvil® is highly toxic to bees and other insects. Beekeepers can, upon notification, protect their bees from the effects of Anvil® by either closing/covering their hives with burlap or dark plastic for 1 to 2 hours during and after treatment. Colonies can be covered for as long as 2 days if the burlap is kept wet (Dadant and Sons, 1975). Running a mist nozzle (water curtain) over hives is another accepted practice that discourages bees from leaving the hive as well as dilutes and washes away any potential pesticide residues to harmless levels. Due to the rapid degradation of Anvil®, protecting bees for 24 hours after treatment should be adequate in preventing mortality. Timing the proposed application as close to sunset as possible should also reduce mortality of foragers, not only in cultivated hives but also on wild colonies. If the USAFR Aerial Spray Flight develops a nighttime profile, bees will not be affected since they are not active at night. US Air Force Fact Sheet entitled “Mosquito Spray Flight Information for Beekeepers” was published to aid area beekeepers in minimizing honeybee loss. This publication is available from the Minot AFB PAO.

Note: *B.t.i.* is not toxic to bees.

SECTION 6. CUMULATIVE IMPACTS:

The larvacides B.t.i.(R) and Altosid(R), being biorational pesticides, are highly specific so they have little to no impact on non-target organisms and possess a relatively short residual activity compared with conventional products. These are the only two products to be used on ACE land. As for the adulticides Anvil(R) and Dibrom(R), application by ULV and size of droplets used insures there would be very little impact, if any on non-target spp. The adulticide applications would be limited to the city boundaries only, not over ACE land, and would only be applied at a time when the target is most active and many non-target spp. would not even come in contact with the material. These products have all been used in the past with no apparent impacts, and are currently used by the Williston Area Vector Control District. Based on all available information to date, cumulative effects would not be an issue.

SECTION 7. IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

The commitment of labor, vehicle fuel, pesticides, aircraft fuel, aircraft maintenance, aircraft operations, and media notification, are all irreversible and irretrievable.

SECTION 8. CONCLUSION

Following review of this site-specific environmental analysis which, in turn, was based upon the best currently available information, we have determined that implementing alternative 4 of this EA in the manner described would not cause significant environmental impact or adverse effects.

This is the reason The Army Corps of Engineers has prepared the FONSI.

SECTION 9. PUBLIC PARTICIPATION

9.1. PUBLIC INVOLVEMENT

The “FONSI” outlining the aerial application of pesticide for mosquito control at Williston, ND will be published in local print media and sent to the following agencies: US Fish and Wildlife Service, US Army Corps of Engineers, North Dakota Department of Health, North Dakota Game and Fish Department, and the North Dakota Division of Community Services.

Local media and publications will be used to notify Williston residents of the FONSI. Residents in the proposed treatment area will be notified 30 to 60 days prior to the anticipated treatment date(s). The notifications will briefly describe the problem, and the proposed action, present the components of the FONSI, mention that this was based on an EA which was prepared for the proposed action, and cite a point of contact for any questions, concerns, or suggestions. The environmental document package, which includes a map of the treatment area, will be available for inspection at both the Williston City Hall and the Williams County Courthouse.

9.2. PUBLIC NOTIFICATION

Williston Area Vector Control will execute notification of the aerial treatment to persons residing in the vicinity of the spray area. This will involve notification of the general public through public media at least 24 hours prior to the aerial application date.

News releases on aerial spray operations will include:

1. Planned primary and alternate treatment dates and time of spraying (contingent upon weather conditions).
2. Area to be treated and why.
3. Information on the nature of the insecticide relative to warm-blooded animals, plants, and painted finishes at the dosages used.
4. Information on the aircraft flying at low altitudes.
5. Information on additional precautionary measures that can be taken to minimize pesticide exposure to humans (e.g., stay indoors during spraying, plan to be out of the treatment area, wash garden crops prior to eating) and effects on property.

SECTION 10. LIST OF AGENCIES AND PERSONNEL CONSULTED

1. Don Tieg, Command Entomologist, Air Combat Command
2. Major Mark Breidenbaugh, Air Combat Command 757 AS/DOS
3. Kevin Johnson, Environmental Containment Specialist, US Fish and Wildlife Service
4. Jeffrey Keller, Natural Resource Manager, US Army Corps of Engineers
5. North Dakota Department of Agriculture
6. Mike Sauer, Senior Scientist, North Dakota Department of Health
7. Mike McKenna, Chief, Conservation and Communications Division, North Dakota Game and Fish Department

SECTION 11. LIST OF PREPARERS

This document was prepared by:

Francis Bosch and Nathan Madden with excerpts taken from Minot AFB EA prepared by Mark Welch and Vicki Johnson, Grand Forks AFB EA prepared by Heidi Durako and Linda Olson, and Langley AFB EA prepared by Mr. Benedict B. Pagac, Jr., Entomologist, US Army Center for Health Promotion and Preventive Medicine, Direct Support Activity – North, Fort George G. Meade, Maryland, 20755-5225.

SECTION 12. LIST OF REFERENCES

12.1. PERTINENT REGULATIONS AND LAWS

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SECTION 13. ACRONYMS AND ABBREVIATIONS

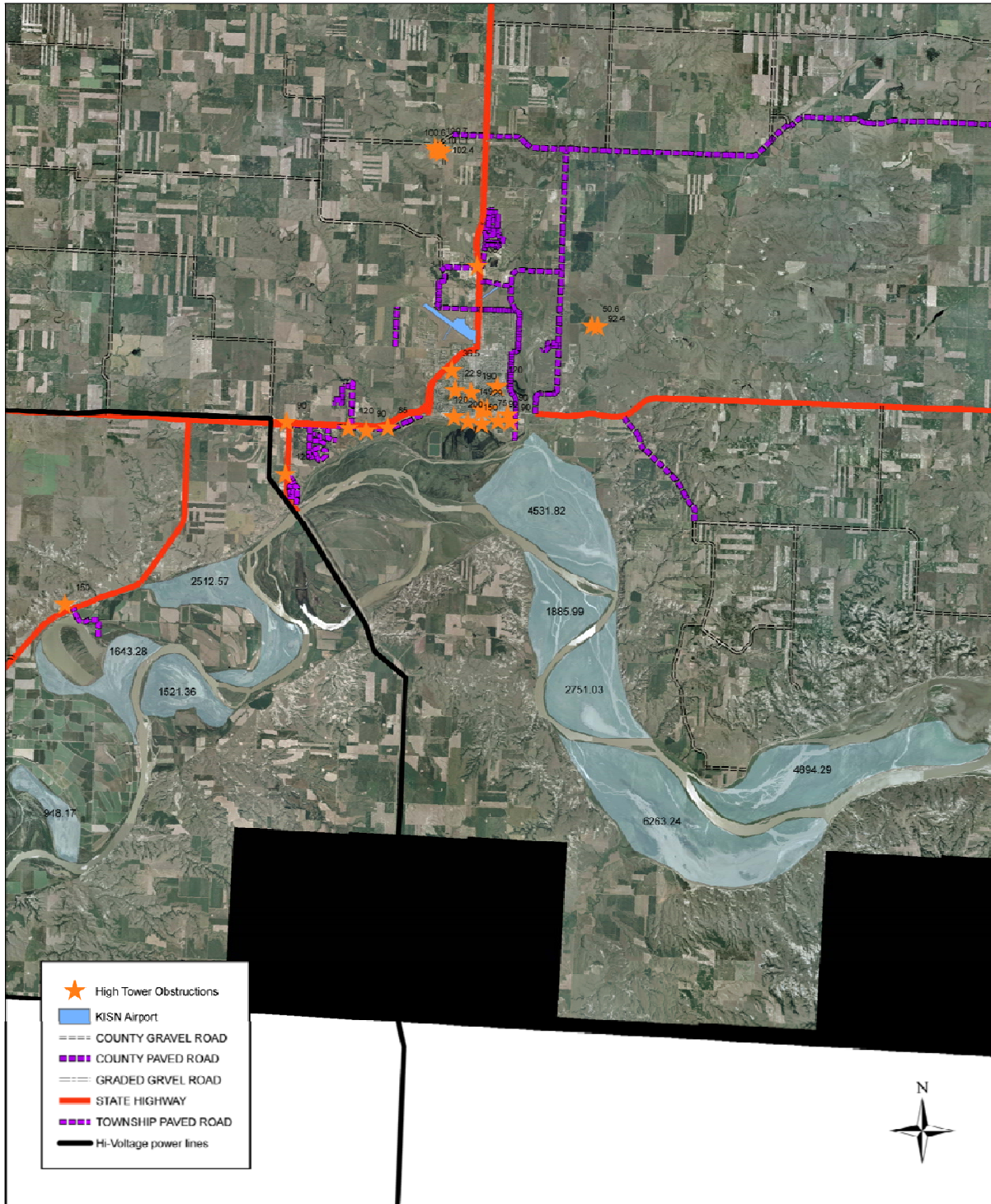
ADNL	A-weighted day night travel
AFB	Air Force Base
AFI	Air Force Instruction
B.t.	Bacillus thuringiensis
B.t.i.	Bacillus thuringiensis variety israelensis
B.t.k.	<i>Bacillus thuringiensis</i> Lepidoptera specific strain
B.s.	Bacillus sphaericus
CDC	Centers for Disease Control
CFR	Code of Federal Regulations
CY	Calendar Year
dBA	decibel A-weighted
DEET	N,N-Diethyl-m-toluamide
DoD	Department of Defense
EA	Environmental Assessment
EEE	Eastern Equine Encephalitis
EPA	Environmental Protection Agency
F	Fahrenheit
FONSI	Finding of No Significant Impact
HAZMAT	Hazardous Material
ICUZ	Installation Compatible Use Zone
IPM	Integrated Pest Management
IREDD	Interim Reregistration Eligibility Decision
ITU	International Toxic Units

MASS	Modified Aerial Spray System
MSDS	Material Safety Data Sheet
MSHA	Mining Safety and Health Administration
MSL	Mean Sea Level
mph	Miles Per Hour
NDDH	North Dakota Department of Health
NEPA	National Environmental Policy Act
NIOSH	National Institute of Occupational Safety and Health
NWR	National Wildlife Refuge
SLE	Saint Louis Encephalitis
spp	Species
SR	Special Review
ULV	Ultra Low Volume
US	United States
USAFR	United States Air Force Reserve
USEPA	United States Environmental Protection Agency
WEE	Western Equine Encephalitis
WNV	West Nile Virus

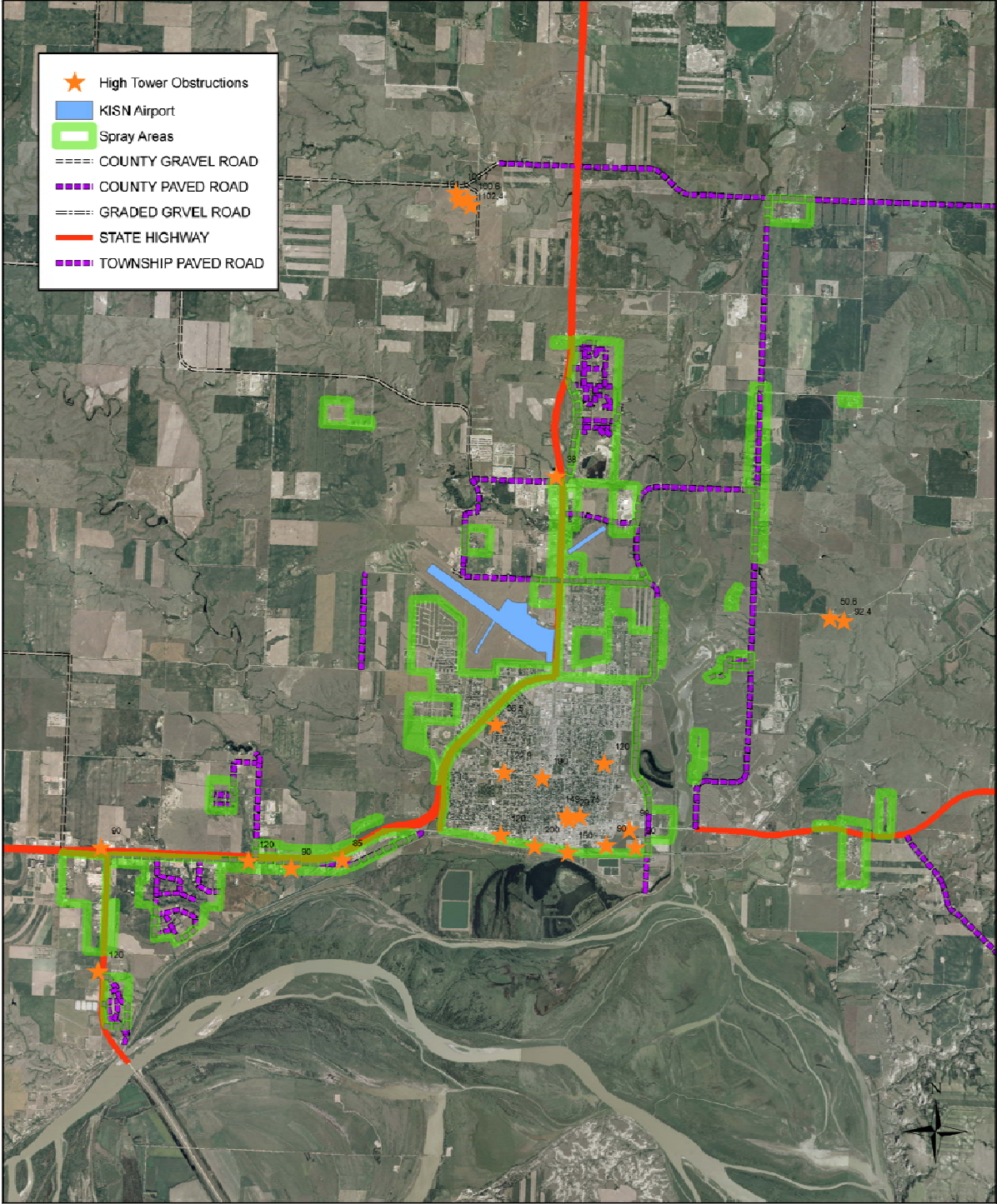
SECTION 14. APPENDICES

Appendix A. Vicinity Maps

Air Force Res. spray areas
map created by Kent Hanson,
Williams County GIS Tech. 3-31-2009.



Williston North Dakota Vector Spray Area 5403 Ac.



Appendix B. Pesticide Labels

Vectobac® 12 AS

Biological Larvicide

VectoBac® 12AS

Aqueous Suspension

Active Ingredient:
Bacillus thuringiensis, subsp. *israelensis*, strain
AM 65-52, fermentation solids and solubles 11.61%
Other Ingredients 88.39%
Total 100.00%

Potency: 1200 International Toxic Units (ITU) per mg
(Equivalent to 4.84 billion ITU per gallon, 1.279 billion ITU per liter)
There is no direct relationship between intended activity (potency) and the Percent Active Ingredient by Weight.

EPA Reg. No. 73049-38
EPA Est. No. 33762-IA-001 List No. 5605

INDEX:

- 1.0 First Aid
- 2.0 Precautionary Statements
 - 2.1 Hazard to Humans (and Domestic Animals)
 - 2.2 Physical and Chemical Hazards
- 3.0 Directions for Use
 - 3.1 Chemigation
- 4.0 Storage and Disposal
- 5.0 Ground and Aerial Application
- 6.0 Application Directions
- 7.0 Nuisance Flies
- 8.0 Nuisance Aquatic Midges
- 9.0 Chemigation
 - 9.1 Rice-Flood (Basin) Chemigation
- 10.0 Small Quantity Dilution Rates
- 11.0 Notice to User

KEEP OUT OF REACH OF CHILDREN
CAUTION

1.0 FIRST AID	
If in eyes	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15-20 minutes.• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.• Call a poison control center or doctor for treatment advice.
If on skin or clothing	<ul style="list-style-type: none">• 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.
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-877-315-9819 (24 hours) for emergency medical treatment and/or transport emergency information. For all other information, call 1-800-323-9597.	

2.0 PRECAUTIONARY STATEMENTS

2.1 HAZARD TO HUMANS (AND DOMESTIC ANIMALS) CAUTION

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

Mixer/loaders and applicators not in enclosed cabs or aircraft must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic sensitization.

2.2 Physical and Chemical Hazards

Diluted or undiluted VectoBac 12AS can cause corrosion if left in prolonged contact with aluminum spray system components. Rinse spray system with plenty of clean water after use. Care should be taken to prevent contact with aluminum aircraft surfaces, structural components and control systems. In case of contact, rinse thoroughly with plenty of water. Inspect aluminum aircraft components regularly for signs of corrosion.

3.0 DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply directly to finished drinking water reservoirs or drinking water receptacles when water is intended for human consumption.

Do not apply when weather conditions favor drift from treated areas. Do not apply to metallic painted objects, such as automobiles, as spotting may occur. If spray is deposited on metallic painted surfaces, wash immediately with soap and water to avoid spotting.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determine the potential for spray drift. The applicator and the treatment coordinator are responsible for considering all these factors when making decisions.

3.1 Chemigation

Do not apply this product through any type of irrigation system unless labeling on chemigation is followed.

4.0 STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.
STORAGE: Store in a cool, [less than 86° F (30° C)], 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 puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Do not reuse container.

5.0 GROUND AND AERIAL APPLICATION

VectoBac 12AS may be applied in conventional ground or aerial application equipment with quantities of water sufficient to provide uniform coverage of the target area. The amount of water will depend on weather, spray equipment, and mosquito habitat characteristics. Do not mix more VectoBac 12AS than can be used in a 72-hour period.

CONTINUED

For most ground spraying, apply in 5-100 gallons of water per acre using hand-pump, airblast, mist blower, etc., spray equipment.

For aerial application, VectoBac 12AS may be applied either undiluted or diluted with water. For undiluted applications, apply 0.25 to 2.0 pt/acre of VectoBac 12AS through fixed wing or helicopter aircraft equipped with either conventional boom and nozzle systems or rotary atomizers.

For diluted application, fill the mix tank or plane hopper with the desired quantity of water. Start the mechanical or hydraulic agitation to provide moderate circulation before adding the VectoBac 12AS. VectoBac 12AS suspends readily in water and will stay suspended over normal application periods. Brief recirculation may be necessary if the spray mixture has sat for several hours or longer. AVOID CONTINUOUS AGITATION OF THE SPRAY MIXTURE DURING SPRAYING.

Rinse and flush spray equipment thoroughly following each use.

For blackfly aerial applications, VectoBac 12AS can be applied undiluted via fixed wing or helicopter aircraft equipped with either conventional boom and nozzle systems or open pipes. Rate of application will be determined by the stream discharge and the required amount of VectoBac 12AS necessary to maintain a 0.5 - 25 ppm concentration in the stream water. VectoBac 12AS can also be applied diluted with similar spray equipment. Do not mix more VectoBac 12AS than can be used in a 72-hour period.

6.0 APPLICATION DIRECTIONS

Do not apply when wind speed favors drift beyond the area of treatment.

Mosquito Habitat	Suggested Rate Range*
(Such as the following examples): Irrigation ditches, roadside ditches, flood water, standing ponds, woodland pools, snow melt pools, pastures, catch basins, storm water retention areas, tidal water, salt marshes and rice fields.	0.25 - 2 pts/acres
In addition, standing water containing mosquito larvae, in fields growing crops such as: Alfalfa, almonds, asparagus, corn, cotton, dates, grapes, peaches and walnuts, may be treated at the recommended rates.	
When applying this product to standing water containing mosquito larvae in fields growing crops, do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.	
Polluted water (such as sewage lagoons, animal waste lagoons).	1 - 2 pts/acre

*Use higher rate range in polluted water and when late 3rd and early 4th instar larvae predominate, mosquito populations are high, water is heavily polluted, and/or algae are abundant.

Blackflies Habitat	Suggested Rate Range
Streams	
Stream water† (= ppm) for 1 minute exposure time	0.5 - 25 mg/liter
Stream water† (= ppm) for 10 minutes exposure time	0.05 - 2.5 mg/liter

†Use higher rate range when stream contains high concentration of organic materials, algae, or dense aquatic vegetation.

†Discharge is a principal factor determining carry of Bti. Use higher rate or increase volume by water dilution in low discharge rivers or streams under low volume (drought) conditions.

7.0 NUISANCE FLIES

For control of nuisance flies (*Psychoda* spp., *Chironomus* spp.) in sewage treatment facilities utilizing trickling filter systems.

APPLICATION DIRECTIONS

Nuisance Fly Habitat	Suggested Rate Range*
Trickling filter system of wastewater treatment plants	10 - 20 mg/liter a.(0.833-1.67 ml) per liter of wastewater feed to the filter per 30 minutes

* Use high rate for control of *Chironomus* spp. Apply undiluted with pre-calibrated pump or other device into the wastewater feeding into the filters for a period of 30 minutes. Repeat applications as needed after 2-4 weeks. Control of *Chironomus* spp. may take up to 2 weeks.

8.0 NUISANCE AQUATIC MIDGES

For control of *Chironomine* midges (*Chironominae: Chironomina*) inhabiting shallow, manmade and natural lakes or ponds.

APPLICATION DIRECTIONS

Nuisance Midge Habitat	Suggested Rate Range*
Shallow Lakes and Ponds per sewage oxidation ponds (less than acre 6 feet deep)	1 gallon (3,785.5 ml) per acre

* Apply diluted with water in total volume of 5 gallons/acre by pouring or spraying over the surface to be treated with pre-calibrated device. Repeat application as needed after 2-4 weeks. Control of *Chironomine* midges may take up to 2 weeks.

9.0 CHEMIGATION

Apply this product through flood (basin) irrigation systems. Do not apply this product through any other type of irrigation system. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from nonuniform distribution of treated water. If you have any questions about calibration, you should contact State Extension Service Specialists, equipment manufacturers or other experts.

A person knowledgeable of this chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

CONTINUED



9.1 RICE-FLOOD (BASIN) CHEMIGATION

Systems using a gravity flow pesticide dispensing system must meter the pesticide into the water at the head of the field and downstream of a hydraulic discontinuity such as a drop structure or weir box to decrease potential for water source contamination from backflow if water flow stops.

VectoBac 12AS is metered or dripped into rice floodwater at application stations positioned at the point of introduction (levee cut) of water into each rice field or pan. Two to three pints of VectoBac 12AS are diluted in water to a final volume of 5 gallons. The diluted solution is contained in a 5 gallon container and metered or dispersed into the irrigation water using a constant flow device at the rate of 80 ml per minute. Introduction of the solution should begin when 1/3 to 1/2 of the pan or field is covered with floodwater. Delivery of the solution should continue for a period of approximately 4-1/2 hours. Floodwater depth should not exceed 10-12 inches to prevent excessive dilution of VectoBac 12AS which could result in reduced larval kill.

Agitation is not required during the period in which the VectoBac 12AS solution is being dispersed.

Application of VectoBac 12AS into rice floodwater is not permitted using a pressurized water and pesticide injection system.

10.0 SMALL QUANTITY DILUTION RATES

**Gallons Spray Solution/Acre
(Ounces Needed per Gallon of Spray)**

VectoBac 12AS

Rate in Pints

Per Acre	10 Gal/A	25 Gal/A	50 Gal/A
0.25 (4 oz)	0.4	0.16	0.08
0.5 (8 oz)	0.8	0.32	0.16
1.0 (16 oz)	1.6	0.64	0.32
2.0 (32 oz)	3.2	1.28	0.64

11.0 NOTICE TO USER

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE CONCERNING USE OF THIS PRODUCT OTHER THAN AS INDICATED ON THE LABEL. USER ASSUMES ALL RISKS OF USE, STORAGE OR HANDLING NOT IN STRICT ACCORDANCE WITH ACCOMPANYING DIRECTIONS.



Altosid® Liquid Larvicide CONCENTRATE



**PREVENTS ADULT MOSQUITO EMERGENCE
(INCLUDING THOSE WHICH MAY TRANSMIT WEST NILE VIRUS)**

SPECIMEN LABEL

ACTIVE INGREDIENT:		
(S)-Methoprene (CAS # 65733-16-6)	20%	
OTHER INGREDIENTS:	80%	
Total	100%	

Formulation contains 1.72 lb/gal (205.2 g/l) active ingredient

EPA Reg No. 2724-446

KEEP OUT OF REACH OF CHILDREN
CAUTION
SEE ADDITIONAL PRECAUTIONARY STATEMENTS

BECAUSE OF THE UNIQUE MODE OF ACTION OF A.L.L.™, SUCCESSFUL USE REQUIRES FAMILIARITY WITH SPECIAL TECHNIQUES FOR APPLICATION TIMING AND TREATMENT EVALUATION. SEE **GUIDE TO PRODUCT APPLICATION** OR CONSULT LOCAL MOSQUITO ABATEMENT AGENCY.

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS
AND DOMESTIC ANIMALS
CAUTION**

Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

FIRST AID
Call a poison control center or doctor immediately for treatment advice.
If in eyes • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
If on skin or clothing • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-248-7763 for emergency medical treatment information.

ENVIRONMENTAL HAZARDS

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.

CHEMIGATION

Refer to supplemental labeling entitled "**Guide to Product Application**" for use directions for chemigation. Do not apply this product through any irrigation system unless the supplemental labeling on chemigation is followed.

MIXING AND HANDLING INSTRUCTIONS

- SHAKE WELL BEFORE USING.** A.L.L. may separate on standing and must be thoroughly agitated prior to dilution.

2. Do not mix with oil; use clean equipment.
3. Partially fill spray tank with water; then add the labeled amount of A.L.L., agitate, and complete filling. Mild agitation during application is desirable.
4. Use spray solution within 48 hours; always agitate before spraying.

APPLICATIONS

A.L.L. must be applied to 2nd, 3rd, or 4th larval instars of floodwater mosquitoes to prevent adult emergence. Treated larvae continue normal development to the pupal stage where they die. This insect growth regulator **has no effect when applied to pupae or adult mosquitoes.** **A.L.L.** has sufficient field life to be effective at label rates when applied to larval stages under varying field conditions. For further information, see **Guide to Product Application.**

METHODS OF APPLICATION

AERIAL

Use the amount of **A.L.L.** listed below in sufficient water to give complete coverage. One-half to 5 gallons of spray solution per acre is usually satisfactory. Do not apply when weather conditions favor drift from areas treated.

GROUND

Determine the average spray volume used per acre by individual operators and/or specific equipment. Mix **A.L.L.** in the appropriate volume of water to give the rate per acre shown below.

APPLICATION RATE

Apply $\frac{3}{4}$ to 1 fl oz of **A.L.L.** per acre (55 to 73 ml/hectare) in water as directed.

APPLICATION SITES

PASTURES

A.L.L. may be applied after each flooding without removal of grazing livestock.

RICE

A.L.L. must be applied to 2nd, 3rd, and/or 4th instar larvae of mosquitoes found in rice, usually within 4 days after flooding. **A.L.L.** treatment may be repeated with each flooding.

INTERMITTENTLY FLOODED NONCROP AREAS

Apply **A.L.L.** as directed above when flooding may result in floodwater mosquito hatch. Typical sites include: freshwater swamps and marshes, salt marshes, woodland pools and meadows, dredging spoil sites, drainage areas, waste treatment and settling ponds, ditches and other natural and manmade depressions.

CROP AREAS

Apply **A.L.L.** to irrigated croplands after flooding to control mosquito emergence. Examples of such sites are: vineyards, rice fields (including wild rice), date palm orchards, fruit and nut orchards, and berry fields and bogs. Irrigated pastures may be treated after each flooding **without** removal of livestock.

DENSE VEGETATION OR CANOPY AREAS

Apply an **A.L.L.** sand mixture using standard granular dispersal equipment. For detailed preparation instructions, refer to **Guide to Product Application.**

STORAGE AND DISPOSAL

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

STORAGE

Store in a cool place away from other pesticides, food, and feed. In case of leakage or spill, soak up with sand or another absorbent material.

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 incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Seller makes no warranty, expressed or implied, concerning the use 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.

Always read the label before using the product.

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

Wellmark

Wellmark International
Schaumburg, Illinois U.S.A.

ZOECON
Professional
Products

A.L.L.[™], ALTOSID[®] Liquid Larvicide Concentrate, and ZOECON, are trademarks of Wellmark International.

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February 2003
Schaumburg, IL

Dibrom[®] Concentrate

 **DIBROM[®] CONCENTRATE**
INSECTICIDE

ACTIVE INGREDIENT:	By Wt.
*Naled	87.4%
OTHER INGREDIENTS:	12.6%
Total	100.0%

*1,2-dibromo-2,2-dichloroethyl dimethyl phosphate

KEEP OUT OF REACH OF CHILDREN

DANGER

DO NOT TAKE INTERNALLY. DO NOT GET IN EYES. DO NOT GET ON SKIN.

SEE SIDE/BACK PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS.

EPA REG. NO. 5481-480

EPA EST. NO. 5481-CA-1

NET CONTENTS: _____ GALLONS



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER

CORROSIVE. Causes irreversible eye and skin damage. May be fatal if swallowed, inhaled or absorbed through the skin. May cause allergic skin reaction. Do not get in eyes, on skin, or on clothing. Do not breathe vapor or spray mist.

When handling this material wear: coveralls over long-sleeved shirt and long pants; chemical-resistant gloves such as barrier laminate, butyl rubber ≥ 14 mils, nitrile rubber ≥ 14 mils and viton ≥ 14 mils; chemical-resistant footwear plus socks; protective eyewear; chemical-resistant headgear for overhead exposure; chemical-resistant apron when cleaning equipment, mixing, or loading; and respirator with either an organic-vapor-removing cartridge with a pre-filter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G).

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE may be reduced or modified as specified in the WPS. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Remove contaminated clothing and wash before reuse.

STATEMENT OF PRACTICAL TREATMENT

IF IN EYES: Immediately hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. Get medical attention immediately.

IF ON SKIN: Wash with plenty of soap and water. Get medical attention immediately.

IF SWALLOWED: Drink a large quantity of milk, egg whites, gelatin solution, or if these are not available, drink large quantities of water. Avoid alcohol. Contact a physician, Poison Control Center or emergency center. Do not induce vomiting. Take person and product container to the nearest medical emergency treatment center.

IF INHALED: Remove victim to fresh air. If not breathing, give artificial respiration and get medical attention immediately.

Note to Physician: Emergency Information — call 24 hours a day 1-800-228-5635, Ext. 169. Naled is a cholinesterase inhibitor. Measurement of blood cholinesterase activity may be useful in monitoring exposure. If signs of cholinesterase inhibition appear, atropine sulfate is antidotal. 2-PAM (Protopam) is also antidotal and may be used in conjunction with atropine, but should not be used alone. Probable mucosal damage may contraindicate the use of gastric lavage.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish, aquatic invertebrates, and wildlife. Do not apply directly to water except when used over water as labeled for adult mosquito, blackfly, or housefly control. For terrestrial uses, do not apply directly to water, or to intertidal areas where surface water is present or to intertidal areas below the mean high water mark. Runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwaters. 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 treatment area.

DIRECTIONS FOR USE

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

READ ENTIRE LABEL. USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

TANK MIXES

NOTICE: Tank mixing or use of this product with any other product which is not specifically and expressly authorized by the label shall be the exclusive risk of user, applicator and/or application advisor. Read and follow the entire label of each product to be used in the tank mix with this product.

DIBROM CONCENTRATE IS FOR USE ONLY BY TRAINED PERSONNEL IN COMMERCIAL PEST CONTROL AND PUBLIC HEALTH OR PEST ABATEMENT PROGRAMS.

DIBROM Concentrate is a special formulation for use undiluted or diluted in diesel oil to be applied for the control of mosquitoes, houseflies and certain other nuisance insects. **This product cannot be diluted with water.**

OPERATIONAL USE INSTRUCTIONS

- All equipment used in the mixing or application (by ground or air) of DIBROM Concentrate should be constructed of corrosion-resistant materials. Stainless steel, bronze, brass, fiberglass, polypropylene and rigid PVC have all proven fairly resistant to the effects of DIBROM Concentrate.
- Use of Teflon or Viton seals is recommended. Avoid use of steel or galvanized steel. Even when these materials are used to construct a spray system, a careful maintenance program involving flushing, cleansing and constant inspection must be followed.
- Strain DIBROM Concentrate as it is being loaded. Use a 100 mesh stainless steel or nylon screen. If product crystallization occurs, warm at 70°F until crystals disappear. The use of DIBROM Concentrate and some grades of diesel fuel may result in precipitates which cause nozzle clogging and operational difficulties.
- Flushing the system following application is essential. Use of heavy aromatic naphtha (HAN), "Jet A" aircraft fuel, Aromatic 150, Aromatic 200, and Aromatic 200ND have been reported as successful. Isopropyl or methyl alcohol is not recommended for flushing due to their low flash point.
- DIBROM Concentrate must be applied using the correct droplet size. Over-atomization produces finer particles which either evaporate or dissipate too quickly and become unavailable for mosquito contact. The spread factor for DIBROM Concentrate on silicone or Teflon-coated slides is 0.54 and 0.7, respectively. If applied incorrectly, DIBROM Concentrate will spot certain automobile paint finishes. Careful attention to recommendations concerning nozzles, nozzle positioning, air speed and droplet size is essential to avoid paint spotting.

A technical bulletin "*DIBROM Concentrate for Use in Mosquito Control Programs*" contains detailed information on equipment for ULV applications.

Aerial Application: Aerial application must be made with closed cockpit aircraft. Spray during periods when wind is 10 mph or less and when thermal activity is low. Nozzles must be positioned 45° to 90° (perpendicular to air flow) into the wind. This positioning results in the maximum wind shear across the face of the nozzles and creates the smallest particles. Air speed should be in excess of 100 mph to assure enough force to create maximum spray atomization. Aircraft flying at slower speeds should be equipped with atomizing nozzles. Use spray nozzles that will produce 30 to 80 micron size droplets. No more than 5% of the droplets should be larger than 80 microns.

Ground Application: Maximum effect is produced by particles 11-20 microns in size. Mass median diameter of the droplets produced should not exceed 15 microns and no droplet should be larger than 50 microns. Excessive pressure and over-atomization result in poor mosquito control.

ADULT MOSQUITO CONTROL

Adult Mosquito Control in Residential Areas, Municipalities, Tidal Marshes, Swamps, Woodlands, Agricultural Areas (when applied in wide-area public pest control programs sponsored by governmental entities), Livestock Pastures, Feedlots and Pasture including Dairy Cattle: It is not necessary to avoid farm buildings, dairy barns, feed or forage areas. Not for use on trees being grown for sale or other commercial use, or for commercial seed production, or for the production of timber or wood products, or for research purposes, (unless applied in wide-area public pest control programs sponsored by governmental entities). Use in agricultural areas should be in a manner as to ensure that residues do not exceed the established federal tolerance for the active ingredient in or on raw agricultural commodities resulting from use for area pest control. Treat shrubbery and vegetation where mosquitoes may rest. Shrubby and vegetation around stagnant pools, marshy areas, swamps, residential areas, municipalities, woodlands, pastures, farm buildings and feedlots may be treated.

Ultra Low Volume (ULV) Aerial Application: Apply ½ to 1 fl. oz. of undiluted product per acre. Use the 1 oz. rate where heavy vegetation exists; i.e., woodlands, etc.

Dilute Aerial Application: Dilute 50 to 100 oz. (1.6 to 3.1 qts.) DIBROM Concentrate in 100 gals. No. 2 Fuel Oil or diesel oil. Apply at the rate of 1 gal. diluted material per acre. This is equivalent to 0.05 to 0.10 lb. actual DIBROM per acre or dilute 1.0 fl. oz. DIBROM Concentrate with HAN (Heavy Aromatic Naphtha) to make 16 fl. oz. Apply at the rate of 16 fl. oz. of dilute mixture per acre. This is equivalent to 0.10 lb. actual DIBROM per acre.

Ultra Low Volume (ULV) Ground Application: Apply DIBROM Concentrate undiluted at the rate of 0.6 fl. oz. per minute at 5 mph; 1.2 fl. oz. per minute at 10 mph; and 1.8 fl. oz. per minute at 15 mph, applying a 300 ft. swath. These flow rates are equivalent to 0.02 lb. actual DIBROM per acre.

CAUTION - SPECIAL INSTRUCTION: This application can be made only under the following conditions:

1. Application can be made only by appropriately licensed and certified personnel with public agencies or private contractors operating in conjunction with or under contract with such government agencies.
2. Application in calm air conditions is to be avoided.
3. Application is not to be made in the immediate vicinity of pedestrians.
4. Vehicles used to apply DIBROM must be air-conditioned or equipped with automatic speed control flow device.

Dilute Ground Application: Dilute 2 qts. (64 fl. oz.) of DIBROM Concentrate in soybean oil or HAN to make 5 gals. of dilute solution. Apply at the rate of 3 to 6 fl. oz. per minute at a vehicle speed of 5 mph applying a swath 300 ft. wide; at 10 mph, deliver 6 to 12 fl. oz. per minute and at 15 mph deliver 9 to 18 fl. oz. per minute. This is equivalent to 0.01 to 0.02 lb. actual DIBROM per acre. Use the high rate and slower speed to penetrate dense vegetation.

Thermal Fog Application: Dilute 3.1 qts. (100 fl. oz.) to 99 gals. No. 2 Fuel Oil or diesel oil or 10 oz per 10 gals. oil. Apply either at the rate of 40 gals. per hour at 5 mph vehicle speed, 80 gals./hour (10 mph) or 120 gals./hour (15 mph) applying swath 300 to 400 feet wide.

BLACKFLIES, HOUSEFLIES, GNATS, CERTAIN OTHER NUISANCE INSECTS

Small Flying Moths, Crane Flies, Midges, Adult Stable Flies (Dog Flies) in Residential Areas, Municipalities, Woodlands, Livestock Pastures, Feedlots and Pastures including Dairy Cattle. It is not necessary to avoid farm buildings, dairy barns, and feed or forage areas. Not for use on trees being grown for sale or other commercial use, or for commercial seed production, or for the production of timber or wood products, or for research purposes, (unless applied as wide-area public pest control programs sponsored by governmental entities).

Thermal Fog Ground Application: Dilute 1 gal. to 99 gals. of No. 2 Fuel Oil or diesel oil or 13 oz. per 10 gals. oil. Apply at a rate of 40 gals. per hour output at an average vehicle speed of 5 mph, applying swath 300 to 400 feet wide.

Thermal Fog Aerial Application: Dilute 100 to 230 fl. oz. ($\frac{3}{4}$ to $1\frac{3}{4}$ gals.) DIBROM Concentrate in 100 gals. No. 2 Fuel Oil or diesel oil. **Smaller Insects - Gnats and Midges:** $\frac{3}{4}$ to 1 gal. **Houseflies, Flying Moths:** 1 to $1\frac{3}{4}$ gals. Apply 1 gal. diluted material per acre. This is equivalent to 0.1 to 0.2 lb. actual DIBROM per acre. **Suppression of Blackflies:** Dilute 1.5 fl. oz. DIBROM Concentrate with 14.5 fl. oz. HAN. Apply at the rate of 16 fl. oz. diluted mix per acre. This is equivalent to 0.16 lb. actual DIBROM per acre.

HORN FLIES (Range Cattle)

Airplane Application: Apply 2 to 4 fl. oz. DIBROM Concentrate undiluted per acre. Use higher rate for heavier fly populations. This is equivalent to 0.2 to 0.4 lb. actual DIBROM per acre.

SUPPRESSION OF DEER FLIES

Aerial Application: Apply 1 to 2 fl. oz. DIBROM Concentrate undiluted per acre. Use higher rate in denser vegetation. This is equivalent to 0.1 to 0.2 lb. actual DIBROM per acre.

Do not apply under conditions involving possible drift to food, forage or other plantings that might be damaged or the crops thereof rendered unfit for sale, use or consumption.

STORAGE AND DISPOSAL

PROHIBITIONS

Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Open dumping is prohibited.

STORAGE

Keep pesticides in original container. Do not put concentrate or dilute into food or drink containers. For help with any spill, leak, fire or exposure involving this material, call day or night 1-800-424-9300.

PESTICIDE DISPOSAL

This product is 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

Triple rinse (or equivalent). Do not reuse container. Offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke. Dispose of in a sanitary landfill or by other procedures allowed by State and local authorities.

OR (the following statement is to be used on returnable containers)

CONTAINER REUSE

RETURNABLE CONTAINER: This container is a dedicated, single-product returnable container. Refill this container only with pesticide. Return empty container to seller at location designated by seller as a collection point. Do not break seals, add anything to container or open container after use. Do not rinse or contaminate empty container. Do not dispose of empty container or use it for any other purposes.

LIMITED WARRANTY AND DISCLAIMER

The manufacturer warrants (a) that this product conforms to the chemical description on the label; (b) that this product is reasonably fit for the purposes set forth in the directions for use, subject to the inherent risks referred to herein, when it is used in accordance with such directions; and (c) that the directions, warnings, and other statements on this label are based upon responsible experts' evaluations of reasonable tests of effectiveness, of toxicity to laboratory animals and to plants and residues on food crops, and upon reports of field experience. Tests have not been made on all varieties of food crops and plants, or in all states or under all conditions.

THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE SET FORTH HEREIN. THE MANUFACTURER NEITHER MAKES NOR INTENDS, NOR DOES IT AUTHORIZE ANY AGENT OR REPRESENTATIVE, TO MAKE ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, AND IT EXPRESSLY EXCLUDES AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE, OR ANY WARRANTY OF QUALITY OR PERFORMANCE. THIS WARRANTY DOES NOT EXTEND TO, AND THE BUYER SHALL BE SOLELY RESPONSIBLE FOR, ANY AND ALL LOSS OR DAMAGE WHICH RESULTS FROM THE USE OF THIS PRODUCT IN ANY MANNER WHICH IS INCONSISTENT WITH THE LABEL DIRECTIONS, WARNINGS OR CAUTIONS.

BUYER'S EXCLUSIVE REMEDY AND MANUFACTURER'S OR SELLER'S EXCLUSIVE LIABILITY FOR ANY AND ALL CLAIMS, LOSSES, DAMAGES, OR INJURIES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, WHETHER OR NOT BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE, SHALL BE LIMITED, AT THE MANUFACTURER'S OPTION, TO REPLACEMENT OF, OR THE REPAYMENT OF THE PURCHASE PRICE FOR, THE QUANTITY OF PRODUCT WITH RESPECT TO WHICH DAMAGES ARE CLAIMED. IN NO EVENT SHALL MANUFACTURER OR SELLER BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT.

AMVAC offers this product, and Buyer accepts it, subject to the foregoing Limited Warranty which may be varied only by agreement in writing signed by an authorized representative of AMVAC.

® A registered trademark of Amvac Chemical Corporation.

Anvil® 10+ 10



ANVIL® 10+ 10 ULV

Contains An Oil Soluble Synergized Synthetic Pyrethroid For Control of Adult Mosquitoes (Including Organophosphate-Resistant Species) In Outdoor Residential and Recreational Areas.

Precautionary Statements HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Harmful if absorbed through the skin. Do not induce vomiting because of aspiration pneumonia hazard. Avoid contact with skin, eyes or clothing. In case of contact flush with plenty of water. Wash with soap and water after use. Obtain medical attention if irritation persists. Avoid contamination of food and feedstuffs.

ENVIRONMENTAL HAZARDS

Do not contaminate untreated water by cleaning of equipment. Cleaning of equipment or disposal of wastes must be done in a manner that avoids contamination of bodies of water or wetlands. This product is toxic to fish. For terrestrial uses, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark.

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.

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.

USE AREAS: For use 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.

For best results, apply when mosquitoes are most active and weather conditions are conducive to keeping the fog close to the ground, i.e. cool temperatures and wind speed not greater than 10 mph.

E.P.A. EST. No. 8329-IL-01
EPA Reg. No. 1021-1686-6329

NET CONTENTS

LOT NO.

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

* Equivalent to 8.00% (butylcarbityl) (5-propylpiperonyl) ether and 2.00% related compounds
** Contains a petroleum distillate
Contains 0.74 pounds of Technical SUMITHRIN®/Gallon and 0.74 pounds Technical Piperonyl Butoxide/Gallon

SUMITHRIN®. Registered trademark of Sumitomo Chemical Company, Ltd.

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.

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: Call a physician or Poison Control Center immediately. Do not induce vomiting because of aspiration pneumonia hazard.

IF IN EYES: Flush eyes with plenty of water. Call a physician if irritation persists.

IF ON SKIN OR CLOTHING: Remove contaminated clothing and wash before reuse. Wash skin with soap and warm water. Get medical attention if irritation persists.

IF INHALED: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth.

For information regarding medical emergencies or pesticide incidents, call the International Poison Center at 1-888-748-8712.

DISTRIBUTED BY

CLARKE MOSQUITO CONTROL
PRODUCTS, INC.

199 N. GARDEN AVENUE • ROSELLE, ILLINOIS 60172

NOTICE: Seller makes no warranty, expressed or implied concerning the use of this product other than 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.

GROUND ULV APPLICATION

APPLICATION AND DILUTION DIRECTIONS: Consult the following table for examples of various dosage rates using a swath width of 300 feet for acreage calculations. This product should be used in cold aerosol generators capable of producing droplets with a MMD of 5 to 25 microns.

Dosage Rate lbs./A./acre	Flow Rates in fluid oz./minute at truck speeds of:			
	5MPH	10MPH	15MPH	20MPH
0.0036	1.6 oz.	3.6 oz.	5.7 oz.	7.6 oz.
0.0024	1.3 oz.	2.5 oz.	3.9 oz.	5.1 oz.
0.0012	0.6 oz.	1.3 oz.	1.9 oz.	2.5 oz.

ANVIL 10 + 10 ULV may be applied undiluted with a non-thermal ULV portable "backpack" spray unit capable of delivering particles in the 5 to 25 micron range. Apply at a walking speed 2 mph, making sure that the same amount of A.I. is applied per acre.

ANVIL 10 + 10 ULV may be applied with suitable thermal fogging equipment. Do not exceed the maximum rates listed above. May be applied at speeds of 5 to 20 mph.

AERIAL APPLICATION

Prohibition on aerial use: Not for aerial application in Florida unless specifically authorized by the Bureau of Entomology, Florida Department of Agriculture and Consumer Services.

Dosage Rate lbs./A./acre	Flow Rates in fluid oz./acre	
	ANVIL® 10 + 10 ULV	
0.0036	62 oz.	
0.0024	42 oz.	
0.0012	21 oz.	

Aerial applications should be done by suitable aerial ULV equipment capable of producing droplets with an MMD of 50 microns or less with no more than 2.5% exceeding 100 microns. Flow rate and swath width should be set so as to achieve 0.21 to 0.62 fluid ounces of ANVIL® 10+10 ULV per acre. 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. Both aerial and ground applications should be made when wind is less than 10 MPH. For application by Public Health Officials and personnel of Mosquito Abatement Districts and other mosquito control programs.

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

STORAGE & DISPOSAL

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

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

CONTAINER DISPOSAL: Triple rinse (or equivalent) then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other approved state and local procedures.

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

FOR MORE INFORMATION CALL:
1-800-323-5727

08/00

Appendix C. Material Safety Data Sheets

Vectobac® 12AS

MATERIAL SAFETY DATA SHEET

PAGE 1

VectoBac® 12AS

MSDS# BIO-0031 Rev. 1

ISSUED 07/3/03

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATERIAL NAME: VectoBac® 12AS
 VectoBac® 12AS II
EPA REG. NO.: 73049-38
List Number: 5605

MANUFACTURER: Valent BioSciences Corporation
 870 Technology Way, Suite 100
 Libertyville, Illinois 60048

EMERGENCY TELEPHONE NUMBERS

Emergency Health or Spill:
 Outside the United States: 651-632-6184
 Within the United States: 877-315-9819

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME: Bacillus thuringiensis, subsp. israelensis
CONCENTRATION: 1.20 %
CAS/RTECS NUMBERS: 68038-71-1 / N/A
OSHA-PEL 8HR TWA: N/L
 STEL: N/L
 CEILING: N/L
ACGIH-TLV 8HR TWA: N/L
 STEL: N/L
 CEILING: N/L
OTHER 8HR TWA: N/A
LIMITS STEL: N/A
 CEILING: N/A

INGREDIENT NAME: Inert Ingredients - identity withheld as a Trade
 Secret
CONCENTRATION: 98.80 %
CAS/RTECS NUMBERS: N/A / N/A
OSHA-PEL 8HR TWA: N/L
 STEL: N/L
 CEILING: N/L
ACGIH-TLV 8HR TWA: N/L
 STEL: N/L
 CEILING: N/L
OTHER 8HR TWA: N/A
LIMITS STEL: N/A
 CEILING: N/A

VectoBac® 12AS**MSDS# BIO-0031 Rev. 1**

ISSUED 07/3/03

2. COMPOSITION/INFORMATION ON INGREDIENTS, continued

EEC (European Community): N/A

Symbol Designation: N/A

Risk Phrases: N/A

Safety Phrases: N/A

3. HAZARDS INFORMATION

EMERGENCY OVERVIEW: Product is non-toxic by ingestion, skin contact, or inhalation. May be irritating to skin and eyes, and may be a skin sensitizer.

ROUTE(S) OF ENTRY: Skin: No
Inhalation: No
Ingestion: No

SKIN CONTACT: Mild irritant

SKIN SENSITIZATION: Possible mild sensitizer

EYE CONTACT: Mild irritant

TARGET ORGANS: N/D

CARCINOGENICITY RATING: NTP: N/L IARC: N/L OSHA: N/L ACGIH: N/L
None

SIGNS AND SYMPTOMS: Direct contact with eyes or skin may cause mild irritation.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: N/D

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4. FIRST AID MEASURES

EYES: Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

SKIN: Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

INGESTION: Remove from source of exposure. If signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

INHALATION: Remove from source of exposure. If signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

5. FIRE FIGHTING PROCEDURES

FLASH POINT: N/D
FLASH POINT METHOD: N/D
LOWER EXPLOSIVE LIMIT(%): N/D
UPPER EXPLOSIVE LIMIT(%): N/D
AUTOIGNITION TEMPERATURE: N/D

FIRE & EXPLOSION HAZARDS: Non-flammable and no explosive properties.

EXTINGUISHING MEDIA: Use appropriate media for underlying cause of fire.

FIRE FIGHTING INSTRUCTIONS: Wear protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

SPILL OR RELEASE PROCEDURES: Recover product and place in appropriate container for disposal. Ventilate and wash area.

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7. HANDLING AND STORAGE

HANDLING: N/D.

STORAGE: Store in a cool (59-86 F or 15-30 C), dry place.

SPECIAL PRECAUTIONS: Wash thoroughly with soap and water after handling.
Keep impervious gloves on until all potentially contaminated personal protective equipment is removed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use local exhaust.

RESPIRATORY PROTECTION: Not usually required. If necessary (Mixers/loaders and applicators not in enclosed cabs or aircraft), use a MSHA/NIOSH approved (or equivalent) respirator with a dust/mist filter (N-95, R-95, or P95).

SKIN PROTECTION: Impervious, waterproof gloves and clothing to minimize skin contact.

EYE PROTECTION: Not usually required. If necessary, use safety glasses or goggles.

OTHER PROTECTION: Wash thoroughly with soap and water after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE: Light brown suspension.

ODOR: N/D

BOILING POINT: N/D

MELTING/FREEZING POINT: N/D

VAPOR PRESSURE (mm Hg): N/D

VAPOR DENSITY (Air=1): N/D

EVAPORATION RATE: N/D

BULK DENSITY: 1.06-1.1 g/mL

SPECIFIC GRAVITY: N/D

SOLUBILITY: Disperses well in water

pH: 4.6-5.0

VISCOSITY: 250-1000 cps at 25 C

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10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.

INCOMPATIBILITIES: Diluted or undiluted product can cause corrosion if left in prolonged contact with aluminum surfaces (e.g. spray equipment, aircraft components).

HAZARDOUS DECOMPOSITION PRODUCTS: N/D.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

ORAL LD50: > 5,000 mg/kg (rat)

DERMAL LD50: > 5,000 mg/kg (rabbit)

INHALATION LC50: > 5.34 mg/l (rat) No lethality was observed in rats after a 4 hour whole body exposure to this concentration of the product as an undiluted aerosol.

CORROSIVENESS: N/D. Not expected to have any corrosive properties.

DERMAL IRRITATION: Transient, mild to moderate redness was observed at the site of application in a skin irritation test in rabbits.

OCULAR IRRITATION: Transient, redness and conjunctival irritation observed in test animals in a study with this product. No positive ocular effects were observed.

DERMAL SENSITIZATION: Eight of ten animals positive in a dermal sensitization study in guinea pigs. Considered to be a mild sensitizer.

SPECIAL TARGET ORGAN EFFECTS: N/D.

CARCINOGENICITY INFORMATION: N/D. None of the components are classified as carcinogens.

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12. ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: N/D

13. DISPOSAL CONSIDERATIONS
-----WASTE DISPOSAL METHODS: Dispose of product in accordance with federal,
state, and local regulations.14. TRANSPORTATION INFORMATION
-----DOT STATUS: Not Regulated
PROPER SHIPPING NAME: N/A
HAZARD CLASS: N/A
UN NUMBER: N/A
PACKING GROUP: N/A
REPORTABLE QUANTITY: N/AIATA/ICAO STATUS: Not Regulated
PROPER SHIPPING NAME: N/A
HAZARD CLASS: N/A
UN NUMBER: N/A
PACKING GROUP: N/A
REPORTABLE QUANTITY: N/AIMO STATUS: Not Regulated
PROPER SHIPPING NAME: N/A
HAZARD CLASS: N/A
UN NUMBER: N/A
PACKING GROUP: N/A
REPORTABLE QUANTITY: N/A
FLASH POINT: N/D15. REGULATORY INFORMATION

TSCA STATUS: Exempt RCRA STATUS: N/D

CERCLA STATUS: N/D PROP 65 (CA): N/D

SARA STATUS: N/D

VectoBac® 12AS

MSDS# BIO-0031 Rev. 1

ISSUED 07/3/03

16. OTHER INFORMATION

REASON FOR ISSUE: Updated Hazard Information (Section 3) and
Toxicological Information (Section 11).
APPROVAL DATE: 07/3/03
SUPERSEDES DATE: 06/12/01
MSDS NUMBER: BIO-0031 Rev. 1

LEGEND: N/A = Not Applicable
N/D = Not Determined
N/L = Not Listed
L = Listed
C = Ceiling
S = Short-term

® = Registered Trademark of Valent BioSciences
(TM) = Registered Trademark of Valent BioSciences

The information and recommendations contained herein are based upon tests believed to be reliable. However, Valent BioSciences does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform with actual conditions of usage may be required. Valent BioSciences assumes no responsibility for results obtained or for incidental or consequential damages arising from the use of these data. No freedom from infringement of any patent, copyright or trademark is to be inferred.



870 Technology Way, Suite 100
Libertyville, IL 60048 - 800-323-9597

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Altosid® Liquid Concentrate SR-20

Date Issued: November, 2004
Supersedes: November, 2003

MATERIAL SAFETY DATA SHEET ZOECON® ALTOSID® LIQUID LARVICIDE CONCENTRATE

Manufacturer: Wellmark International
Address: 1501 E. Woodfield Rd., Suite 200 West, Schaumburg, IL 60173
Emergency Phone: 1-800-248-7763
Transportation Emergency Phone: CHEMTREC: 1-800-424-9300

1. CHEMICAL PRODUCT INFORMATION

Product Name: Zoecon Altosid® Liquid Larvicide Concentrate
Chemical Name/Synonym: (S)-Methoprene; isopropyl (2E,4E,7S)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate
Chemical Family: Terpenoid
Formula: C₁₉H₃₄O₃
EPA Registration No.: 2724-446
RF Number: 437

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Component (chemical, common name)</u>	<u>CAS Number</u>	<u>Weight</u>	<u>Tolerance</u>
(S)- Methoprene: Isopropyl (2E,4E,7S)-11-Methoxy-3,7,11-trimethyl-2,4-dodecadienoate	65733-16-6	20.0%	Not established
Inert ingredients (non-hazardous and/or trade secret)		80% 0	N/A

3. HAZARD INFORMATION

PRECAUTIONARY STATEMENT

Caution: Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

No adverse reactions have resulted from normal human exposure during research and testing.

PRIMARY ROUTE OF ENTRY Dermal/Eye: Yes Oral: No Inhalation: No

ACUTE TOXICITY Oral: LD50 (rat): >34,000 mg/kg (highest dose tested) (HDT) (Based on (S) Methoprene)
Dermal: LD50 (rabbit): >2000 mg/kg (highest dose tested) (HDT) (Based on (S) Methoprene)
Inhalation: LC50 (rat): >5.19 mg/L air (Based on (S) Methoprene)

OTHER TOXICOLOGICAL INFORMATION

- Skin Irritation:** Non-irritating (rabbit) (Based on (S) Methoprene)
Eye Irritation: Practically non-irritating (rabbit) (Based on (S) Methoprene)
Sensitizer: Not a sensitizer (guinea pig) (Based on (S) Methoprene)

4. FIRST AID MEASURES

- Eye:** Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a poison control center or doctor for treatment advice.
- Skin:** Take off contaminated clothing. Rinse skin immediately with soap and water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
- Ingestion:** Drink 1-2 glasses of water and try to induce vomiting. Seek medical attention. Never give anything by mouth to an unconscious person.
- Inhalation:** Remove victim to fresh air. See a physician if cough or other respiratory symptoms develop.
- Note to Physician:** Treat symptomatically

5. FIRE FIGHTING MEASURES

- NFPA Rating:** Health: 0 Fire: 0 Reactivity: 0
- Flammability Class:** N/A
- Flash Point:** Does not flash
- Explosive Limits (% of Volume):** None
- Extinguishing Media:** Water, foam, CO2
- Special Protective Equipment:** Firefighters should wear protective clothing and self contained breathing apparatus.
- Fire Fighting Procedures:** Normal procedures. Do not allow fire fighting water to escape into waterways or sewers.
- Combustion Products:** Carbon monoxide, carbon dioxide
- Unusual Fire/Explosion Hazards:** None

6. ACCIDENTAL RELEASE MEASURES

- Steps to be taken:** In case of leakage or spill, soak up with absorbent material. Place in a container for disposal.
- Absorbents:** Clay granules, sawdust, dirt or equivalent.
- Incompatibles:** None

7. HANDLING AND STORAGE

- Handling:** Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling.
- Storage:** Store in a cool, dry place, away from other pesticides, food and feed.

8. EXPOSURE CONTROL / PERSONAL MEASURES

Exposure Limits: Not established

Ventilation: Use with adequate ventilation.

Personal Protective Equipment: Under ordinary use conditions, no special protection is required. If prolonged exposure is expected, it is recommended to wear a MSHA/NIOSH approved organic vapor/pesticide respirator, impervious gloves, chemical goggles or safety glasses with side shields.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Creamy, yellow liquid with slight odor.

Boiling Point: 100 C

Melting Point: Not applicable

Vapor Pressure (mm Hg): 17.5 mm Hg

Vapor Density (Air = 1): 0.6 (water phase)

Specific Gravity: 1.04 - 1.06

Bulk Density: 8.3 lbs/gal

Solubility: Disperses in water

Evaporation Rate: Approximately 0.8

pH: 6.3 - 6.8

10. STABILITY AND REACTIVITY

Stability: Stable

Reactivity: Non-reactive

Incompatibility w/ Other Materials: Bleach, oxidizing/alkaline materials

Decomposition Products: None

Hazardous Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

CHRONIC TOXICITY [Based on (RS)-Methoprene]

Methoprene is not considered as an oncogenic compound. The NOEL for non-carcinogen effects in an 18-month mouse study was 250ppm.

DEVELOPMENTAL/REPRODUCTIVE TOXICITY [Based on (RS)-Methoprene]

Methoprene is not a teratogenic compound. The NOEL for maternal and embryo toxicity in rabbits was 200/mg/kg/day. The NOEL for reproductive effects in rats was 500 ppm.

MUTAGENICITY [Based on (RS)-Methoprene]

Methoprene is not a mutagenic compound.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE [Based on (RS)-Methoprene]

Hydrolysis: T1/2 > 4 weeks

Photolysis: T1/2 < 10 hours

Soil half life: ~ 10 days

Water solubility: < 2 ppm

ECOTOXICITY [Based on (S)-Methoprene]

Acute Toxicity: fish:LC50 (trout): 760 ppb, (bluegill): > 370 ppb ;

aquatic invertebrates:LC50 (Daphnia): 360 ppb

13. DISPOSAL CONSIDERATIONS

Do not contaminate water, food, or feed by disposal. **Pesticide Disposal:** Wastes resulting from this product may be disposed of on site or at an approved waste management facility. **Container Disposal:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

14. TRANSPORT INFORMATION

DOT49CFR Description: Not regulated as hazardous by D.O.T., I.A.T.A. or I.M.D.G.

Freight Classification: Insecticides, NOI other than poison in boxes or drums. NMFC 102120

15. REGULATORY INFORMATION

CERCLA (Superfund): Not regulated

RCRA: Not regulated as hazardous

SARA 311/312 HAZARD CATEGORIES

Immediate Health: Yes (irritation)

Delayed Health: No

Fire: No

Sudden Pressure: No

Reactivity: No

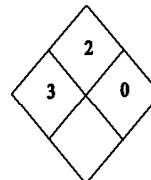
The information presented herein, while not guaranteed, was prepared by technically knowledgeable personnel and to the best of our knowledge is true and accurate. It is not intended to be all inclusive and the manner and conditions of use and handling may involve other or additional considerations.

**AMVAC CHEMICAL CORPORATION
DIBROM® CONCENTRATE
DIBROM® 14 CONCENTRATE (HIGH FLASH)**

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: DIBROM® CONCENTRATE; DIBROM® 14
CONCENTRATE (HIGH FLASH)
GENERAL USE: Insecticide
PRODUCT DESCRIPTION: Off-white to straw yellow liquid with a sharp, pungent
odor
EPA Registration Number: 5481-480
MSDS No.: 260_7
Current Revision Date: 2 May 2002



MANUFACTURER:
AMVAC CHEMICAL CORPORATION
4100 E. Washington Blvd.
Los Angeles, CA 90023-4406
Ph: 323-264-3910
FAX: 323-268-1028

EMERGENCY TELEPHONE NUMBERS:
MANUFACTURER: 323-264-3910
TRANSPORTATION (24 HOURS)
CHEMTREC: 800-424-9300
OTHER (24 HOURS)
AMVAC: 323-264-3910

2. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	WT %	CAS No.
Naled (Dimethyl 1,2-dibromo-2,2-dichloroethyl phosphate)	87.4%	300-76-5
Other Components	12.6%	

OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)

COMPONENT	HAZARD	OSHA PEL*	ACGIH TLV*
Naled (Dimethyl 1,2-dibromo-2,2-dichloroethyl phosphate)(300-76-5)	POISON; CORROSIVE	3 mg/m ³ (Cal- OSHA)	0.1 mg/m ³
DDVP (2,2-Dichloroethenyl dimethylphosphate)(62-73-7)	POISON; Possible carcinogen	1 mg/m ³	0.1 mg/m ³

* Exposure Limits 8 hrs. TWA

DIBROM is a registered Trademark of AMVAC Chemical Corporation.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

DANGER! POISON! CORROSIVE! An off-white to straw yellow liquid with a sharp, pungent odor that causes irreversible eye and skin damage. May be fatal if swallowed, inhaled or absorbed through skin and eyes. Is a cholinesterase inhibitor. Rapidly absorbed through skin. Repeated inhalation or skin contact may, without symptoms, progressively increase susceptibility to organophosphate (including Naled) poisoning. May be an aspiration hazard. May cause an allergic reaction.
Product is combustible.
Toxic to fish, birds, and other wildlife.

POTENTIAL HEALTH EFFECTS

ROUTE(S) OF ENTRY: May be fatal if absorbed through the eye or skin, is ingested or is inhaled. May produce acute cholinesterase depression. May cause corrosive destruction of the skin, mucous membranes and the eyes.

SIGNS OF ACUTE OVEREXPOSURE: Acute cholinesterase depression may be evidenced by headache, nausea, vomiting, diarrhea, abdominal cramps, excessive sweating, salivation and tearing, constricted pupils, blurred vision, tightness in chest, weakness, muscle twitching and confusion; in extreme cases, unconsciousness, convulsions, severe respiratory depression and death may occur.

This product is expected to be corrosive to the eyes. The degree of injury will depend on the amount and duration of the contact and the speed and thoroughness of the first aid treatment. Expected adverse health effects resulting from direct exposure to the eye may include pain, tears, swelling, redness, blurred vision, irreversible eye damage and possibly blindness.

This product is expected to be corrosive to the skin. The degree of injury will depend on the amount and duration of the contact and the speed and thoroughness of the first aid treatment. The expected adverse health effects resulting from a direct exposure to the skin may include pain or a feeling of heat, discoloration, swelling, blistering, and irreversible tissue damage.

This product is expected to be corrosive to the digestive tract, and, if ingested, may cause nausea, vomiting and diarrhea.

This product is expected to be corrosive to the respiratory tract, and, if inhaled, may cause symptoms that include nasal discharge, sore throat, coughing, bronchitis, pulmonary edema, and difficulty in breathing.

3. **HAZARDS IDENTIFICATION, cont'd**

SIGNS OF CHRONIC OVEREXPOSURE: Repeated exposures to small doses of Naled and other organophosphates may lower the cholinesterase to levels where the above symptoms of acute overexposure are observed.

CARCINOGENICITY: EPA under its 1999 proposed Guidelines for Carcinogen Risk Assessment has classified DDVP, an impurity in Naled, as having "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential.". IARC lists DDVP (Dichlorvos) as being possibly carcinogenic to humans (Group 2B). **CARE SHOULD BE EXERCISED IN HANDLING THIS FORMULATION.**

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Preexisting conditions which lower cholinesterase levels increase vulnerability to cholinesterase depression. These include: (for plasma) genetic cholinesterase deficiency; advanced liver disease; chronic alcoholism; malnutrition; dermatomyositis; existing toxicity from exposure to carbon disulfide; benzalkonium salts, organic mercury compounds, ciguatoxins or solanines; and (for RBC) hemolytic anemias.

4. **FIRST AID MEASURES**

DIBROM® 14 CONCENTRATE (High Flash) CONTAINS A CHOLINESTERASE INHIBITOR (NALED). A PHYSICIAN SHOULD BE CONTACTED IN ALL CASES OF EXPOSURE TO NALED AND ITS FORMULATIONS. THIS PRODUCT IS CORROSIVE TO EYES AND SKIN.

EYES: Immediately flush the eyes with copious amounts of clear, cool running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. Contact a physician immediately. If there will be a delay in getting medical attention, rinse the eyes for at least another 15 minutes.

INHALATION: Remove victim to fresh air. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration. If breathing is difficult, give oxygen. Contact a physician immediately.

INGESTION: DO NOT induce vomiting. If victim is conscious, administer an 8 oz. glass of water containing 2 tbsp. activated charcoal. Have person lie on their left side to slow down absorption of the ingested material. Never give anything by mouth to an unconscious person. Contact a physician immediately.

SKIN: Immediately flush all affected areas with large amounts of clear water for at least 15 minutes. Remove contaminated clothing. Do not attempt to neutralize with chemical agents. Wash clothing before reuse. Contact a physician immediately.

4. **FIRST AID MEASURES, cont'd**

NOTE TO PHYSICIANS: This is an Organophosphate (OP) Insecticide. Do not wait for laboratory confirmation to treat patients with strong clinical evidence of poisoning. In the USA and other countries, contact your local or national poison control center for more information.

Do Not handle the patient without the following protective equipment in place: chemical resistant gloves and apron (preferably nitrile). Remove contaminated clothing and do not reuse without thorough cleaning with detergent and hot water. Dispose of heavily contaminated clothing, including shoes, as a hazardous waste.

Establish airway and oxygenation. IV Atropine sulfate is the antidote of choice. Moderately severe poisoning: use 0.4-2.0 mg in adults or 0.05 mg/kg in children. Repeat every 15 minutes until atropinization is achieved. Severe poisoning may require larger doses. Cholinergic toxicity may recur as atropinization wears off; monitor patient closely. Draw blood for RBC and plasma cholinesterase. In addition, Pralidoxime (2-PAM) is indicated during the first 36 hours in severe poisonings. Slow IV administration (no less than 2 minutes) of 1 gm in adults or 20-50 mg/kg in children may be repeated in 1 to 2 hours if muscle weakness, twitching, and/or respiratory depression persist. Avoid morphine, aminophylline, phenothiazines, reserpine, furosemide and ethacrynic acid.

Bathe and shampoo contaminated skin and hair. If ingested, empty stomach. Due to the presence of aromatic solvents, gastric lavage should be considered following intubation with a cuffed endotracheal tube to prevent aspiration of vomitus. Activated charcoal is useful to further limit absorption.

5. **FIRE FIGHTING MEASURES**

FLAMMABLE PROPERTIES

Flash Point: 151°F (closed cup)

Autoignition Temperature: No data available

Flammable Limits:

Lower flammable limit: No data available

Upper flammable limit: No data available

Flammability: This is a combustible liquid that will burn when heated (NFPA rating = 2)

EXPLOSIVITY

Mechanical Impact: Not explosive

Static Discharge: Will not occur

HAZARDOUS COMBUSTION PRODUCTS: This product will emit toxic fumes when burned, including hydrogen chloride, hydrogen bromide, phosphorous oxides and carbon monoxide. Vapors of the unburned product may also be hazardous. Contact with the fumes and vapors should be avoided by staying upwind and by wearing impervious clothing and positive pressure self-contained breathing apparatus.

5. **FIRE FIGHTING MEASURES, cont'd**

EXTINGUISHING MEDIA: Foam, dry chemical, carbon dioxide, water spray (fog).

FIRE FIGHTING INSTRUCTIONS: Evacuate nonessential personnel from the area. Keep upwind. Wear self-contained breathing apparatus and impervious clothing, including gloves and eye protection. Clean all clothing before reuse.

6. **ACCIDENTAL RELEASE MEASURES**

GENERAL: Evacuate personnel and thoroughly ventilate the area. Use adequate ventilation and air-supplied respirators, as well as impervious clothing and safety goggles. Keep bystanders upwind and away from the spill.

SMALL SPILL: Cover with nonflammable absorbent (clay, sand, oil dry, kitty litter, etc.) to absorb the liquid. Sweep into an open plastic drum. Decontaminate the area and equipment with dilute alkali or ammonia (less than 5% solution) and detergent. Flush the area with water. Absorb and sweep into the same open plastic drum. Close the drum and dispose of as a hazardous waste.

LARGE SPILL: Dike the spill to prevent contamination of local water sources. Siphon the majority of the liquid into drums for use or disposal, depending on the circumstances. Clean the area as described for a small spill.

7. **HANDLING AND STORAGE**

HANDLING: Prevent skin contact. Do not breathe fumes. Wear appropriate personal protective equipment (See Section 8). Wash thoroughly and change clothes after handling. Keep product away from food drink, cosmetics, and tobacco products. See product label for more detailed handling procedures.

STORAGE: Do not contaminate water, food or feed by storage or disposal. Store product in a cool, dry, locked place out of reach of children. Store in original container.

8. **EXPOSURE CONTROLS/PERSONAL PROTECTION**

ENGINEERING CONTROLS: A well-ventilated area is recommended for handling DIBROM® 14 Concentrate. Use of mechanical or local exhaust systems is recommended.

8. **EXPOSURE CONTROLS/PERSONAL PROTECTION, cont'd**

RESPIRATORY PROTECTION: When respiratory protection is required, or concentrations may exceed the PEL, use a NIOSH/MSHA approved air-purifying respirator equipped with organic vapor cartridges or canisters. For emergency and other conditions where the exposure limit may be greatly exceeded, use an approved positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

SKIN PROTECTION: Chemical resistant gloves (preferably nitrile), body covering clothing that has long sleeves and long pants, and chemical resistant shoes or boots, are required to prevent skin contamination. A chemical resistant apron is required when there is a risk of spillage or splashing. Wear clean clothes daily. Wash well with soap and water after handling this product. See the label for more specific instructions.

EYE PROTECTION: Safety glasses should be worn whenever working with chemicals. Goggles or a faceshield are required if there is a chance of splashing.

9. **PHYSICAL AND CHEMICAL PROPERTIES**

Physical State:	Liquid
Appearance:	An off-white to straw yellow color
Odor:	Sharp, pungent, with overtones of aromatic solvent
Odor Threshold:	No data available
Boiling Point:	320°F/160°C
Freezing/Melting Point:	60°F/15°C
Specific Gravity:	1.794 to 1.831
Density:	14.97 to 15.28 lb/gal
Vapor Pressure (mm/Hg):	10 mm Hg @ 100°F
Vapor Density:	Heavier than air
Percent Volatile by Vol:	5%
Solubility in Water:	0.2%
Solubility (Other):	This product is soluble in aromatic hydrocarbons, chlorinated hydrocarbons, ketones, and esters
Partition Coefficient (O/W):	Approx. 100 (a.i.) at ambient temperatures
pH:	Not available
Evaporation Rate:	Not available

10. **STABILITY AND REACTIVITY**

CHEMICAL STABILITY (Conditions to avoid): This product is stable under normal use and storage conditions. It may be photochemically reactive.

10. STABILITY AND REACTIVITY, cont'd

INCOMPATIBILITY: Unstable in the presence of iron or alkaline media. Corrosive to iron, aluminum and magnesium. Hydrolyzes slowly under neutral or acid conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Heating product to decomposition will cause emission of acrid smoke and fumes of hydrogen chloride, hydrogen bromide, phosphorous oxides, carbon oxides and unknown organic compounds.

HAZARDOUS POLYMERIZATION: This product will not polymerize.

11. TOXICOLOGICAL INFORMATION

The following information is available for Naled technical and two related formulations, DIBROM® 8 and DIBROM® 14:

INGESTION:	Oral LD ₅₀ (rat):	92/191 mg/kg (female/male)(Naled Technical)
INHALATION:	Inhalation LC ₅₀ (rat):	1520 mg/m ³ , 4 hr (DIBROM® 8)
DERMAL:	Skin LD ₅₀ (rabbit):	360/390 mg/kg (female/male) Naled Technical)
IRRITATION:	Eye irritation:	Corrosive (DIBROM® 14) Toxicity Category I
	Skin irritation:	Corrosive (DIBROM® 14) Toxicity Category I
SENSITIZATION:	Skin sensitization: (guinea pig)	Weak Skin Sensitizer (Naled Technical)

CORROSIVENESS (DOT): A study run with Naled Technical showed that Naled Technical is considered noncorrosive by DOT criteria when applied to the intact skin of albino rabbits.

TERATOGENICITY: Maternal toxicity in rats was observed at 40 mg/kg/day (body weight loss, tremors, painful or difficult breathing, and decreased activity) using Naled Technical (a.i.). No developmental effects were observed at this dose level. The maternal NOEL was 10 mg/kg/day. The developmental NOEL was 40 mg/kg/day.

REPRODUCTIVE TOXICITY: In a two-generation rat reproduction study with Naled Technical (a.i.), a decrease in male body weight gain was observed at 18 mg/kg/day; however, no effects on reproduction were found in adult animals. Decreases in offspring survival, number of pups born and decreased pup weights were noted at 18 mg/kg/day. The NOEL for both adults and offspring was 6 mg/kg/day.

MUTAGENICITY: No evidence of mutagenicity activity from *in vitro* and *in vivo* tests, using Naled Technical (a.i.).

CARCINOGENICITY: No evidence of carcinogenicity in laboratory animals with Naled Technical. However, EPA under its 1999 proposed Guidelines for Carcinogen Risk Assessment has classified DDVP, an impurity in Naled, as having "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential."

TOXICOLOGICALLY SYNERGISTIC PRODUCTS: No data available.

12. ECOLOGICAL INFORMATION

This product is toxic to fish, birds, and other wildlife. Keep out of any body of water. Do not contaminate water when disposing of equipment washwaters or wastes.

13. DISPOSAL CONSIDERATIONS

Waste 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 by use according to label instructions, contact your nearest State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA regional office for guidance. Open dumping is prohibited.

Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke. Contact the State or local authorities to determine the current regulations.

14. TRANSPORTATION INFORMATION

DOT Class	: 6.1
Canada	: 6.1
Australia	: 6 Subsection 111
ADR Class (road)	: 6.1
UN Number	: 3018
IMDG Class (sea)	: 6.1
IATA Class	: 6.1
Marine Pollutant	: Yes
Packing Group	: III
Hazard label(s)	: TOXIC
Proper shipping name	: Organophosphorus pesticides, liquid, toxic (Naled)
Reportable Quantity	: Yes

PACKAGING

General description : 5 gallon , 15 gallon, 30 gallon, and 60 gallon polyethylene drums

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

This product is registered under EPA/FIFRA Regulations. It is a violation of Federal Law to use this product in any manner inconsistent with its labeling. Read and follow all label directions. This product is excluded from listing requirements under EPA/TSCA.

CANADIAN REGULATIONS:

This product is not registered under the Pest Control Product Act of Canada.

EUROPEAN UNION REGULATIONS:

This product is not registered in the European Union.

AUSTRALIAN REGULATIONS:

This product is undergoing registration in Australia. It is a violation of Australian Law to use this product in any manner inconsistent with its labeling.

SARA TITLE III DATA

Section 311 & 312 Hazard Categories:

Immediate Health Hazard:	Yes
Delayed Health Hazard:	Yes
Fire Hazard:	Yes
Reactive Hazard:	No
Sudden Pressure Release Hazard:	No

Section 302 Extremely Hazardous Substances: DDVP (Dichlorvos, 62-73-7)

Section 313 Toxic Chemicals: Naled (300-76-5); DDVP (Dichlorvos, 62-73-7); Naphthalene (91-20-3)

CERCLA/EHS Reportable Quantities: DDVP (Dichlorvos) - 10 lbs; Naled - 10 lbs;
Product (calc'd) - 11 lbs

STATE REGULATIONS:

CALIFORNIA (Proposition 65): This product contains a chemical known to the State of California to cause cancer - DDVP.

16. OTHER INFORMATION

MSDS Status:

Date This Revision: 5/02/02

Date Previous Revision: 8/13/01

Person Responsible for Preparation: Gary A. Braden

Reasons for Revision: New information has led to changes in sections 2, 11 and 14.

16. OTHER INFORMATION, cont'd

DISCLAIMER:

This information is provided for the limited guidance to the user. While AMVAC believes that the information is, as of the date hereof, reliable, it is the user's responsibility to determine the suitability of the information for its purposes. The user is advised not to construe the information as absolutely complete since additional information may be necessary or desirable when particular, exceptional, or variable conditions or circumstances exist (like combinations with other materials), or because of applicable regulations. No express or implied warranty of merchantability or fitness for a particular purpose or otherwise is made hereunder with respect to the information or the product to which the information relates.

ABBREVIATIONS:

a.i.	-	active ingredient
ACGIH	-	American Conference of Governmental Industrial Hygienists
ADR	-	Mark used to indicate European Approval for the Transport of Dangerous Goods by Road
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	-	Department of Transportation (USA)
EPA	-	Environmental Protection Agency
FIFRA	-	Federal Insecticide, Fungicide, and Rodenticide Act
IARC	-	International Agency for Research on Cancer
IATA	-	International Air Transport Association
IMDG	-	International Maritime Dangerous Goods
NTP	-	National Toxicology Program
SARA	-	Superfund Amendments and Reauthorization Act
TSCA	-	Toxic Substances Control Act

This is the last page of this MSDS. There should be 10 pages.

Material Safety Data Sheet

Date last revised: 5 March 1999

I. General Information

Chemical Name and Synonyms Sumithrin Piperonyl Butoxide	Trade Name & Synonyms Anvil 10+10 ULV
Chemical Family Synergized Synthetic Pyrethroid	EPA Registration Number 1021-1688-8329
Proper DOT Shipping Name Environmentally Hazardous Substances, Liquid, N.O.S., Marine Pollutant (d-Phenothrin) [bulk only]	DOT Hazard Classification Class 9, UN 3082 [bulk only]
Manufacturer Clarke Mosquito Control Products, Inc.	Manufacturer's Phone Number (630) 894-2000
Manufacturer's Address 159 North Garden Avenue Roselle, Illinois 60172	INFOTRAC (Emergency) Hotline 1-800-535-5053

II. Ingredients

Principal Hazardous Components	CAS #	Percent
Sumithrin® [3-Phenoxybenzyl-(1RS, 3RS; 1RS, 3SR) 2,2-dimethyl-3-(2-methylprop-2-enyl) cyclopropane-carboxylate]	026002-80-2	10.00%
Piperonyl Butoxide [Alpha-(2-(1-butoxyethoxy)-4,5-methylenedioxy-2-propyltoluene)]	000051-03-6	10.00%
White Mineral Oil	064742-55-8 (-56-9)	40 – 78%
Aromatic Hydrocarbon	064742-94-5	1 – 15%

III. Physical Data

Boiling Point (°F): Not Established	Specific Gravity (H₂O = 1): 0.884
Vapor Pressure (mm Hg.): Not Established	Vapor Density (Air = 1): Not Established
Solubility in Water: Emulsifiable	pH: Not Applicable
Appearance: Liquid, Clear with a light yellow tinge	Odor: Pungent aromatic, similar to smell of mothballs

IV. Fire & Explosion Hazard Data

Flash Point (Test Method): +200 °F (Tag Closed Cup)
Extinguishing Media: Foam, carbon dioxide, or dry chemical
Special Fire Fighting Procedures: Treat as an oil fire. Use a full-faced self-contained breathing apparatus along with full protective gear. Keep nearby containers and equipment cool with a water stream. Contain the run-off, if possible, for proper disposal.

V. Health Hazard Data

Exposure Limits: Not established by OSHA or ACGIH
EMERGENCY FIRST AID
Skin Contact: CAUTION. Can cause a burning sensation on more sensitive areas (face, eyes, mouth). Prolonged or repeated exposure can cause irritation and reddening of the skin, possibly progressing into dermatitis. Immediately flush affected area with large amounts of water. Remove contaminated clothing and wash affected areas with soap and water. If irritation persists, get medical attention.
Eye: CAUTION. Can cause temporary irritation, tearing, and blurred vision. Immediately flush with large amounts of water for at least 15 minutes. If irritation persists, get medical attention
Inhalation: CAUTION. Excessive inhalation can cause nasal and respiratory irritation. Remove affected person to fresh air. Give oxygen, if necessary. If breathing has stopped, administer artificial respiration and get medical attention immediately
Ingestion: CAUTION. Can cause stomach irritation, resulting in nausea, cramps and vomiting. Excessive ingestion can cause nervous system disorders, such as fatigue, dizziness, headaches, lack of coordination, tremors and unconsciousness. Do not induce vomiting because of aspiration pneumonia hazard. Call a physician or poison control center.

VI. Reactivity Data

Stability:	Stable
Incompatibility	Strong acidic or alkaline materials
Hazardous Decomposition Products	Not Applicable

Material Safety Data Sheet

Anvil 10+10 ULV

Date last revised: 5 March, 1999

VII. Environmental Protection Procedures

Spill Response:

Shut off ignition sources. Stop release, if possible without risk. Dike or contain release, if possible, and if immediate response can prevent further damage or danger. Isolate and control access to the release area. Take actions to reduce vapors. Absorb with appropriate absorbent. For large spills, collect product into drums, etc., via drains, pumps, etc. Absorb with appropriate absorbent. Clean spill area of residues and absorbent. Contaminated absorbent and wash water should be disposed of according to local, state and federal regulations.

Storage:

Store containers upright and closed. Store in areas that are cool, dry and well-ventilated. Keep away from heat, ignition sources and strong oxidizers. Emptied containers may retain product residues.

Waste Disposal:

Do not contaminate water when disposing of equipment wash waters. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA. Do not mix with other waste materials.

VIII. Special Protection Information

Eye Protection: OSHA-approved safety glasses, goggles or face shield

Skin Protection: Handlers should wear protective clothing, chemical resistant gloves, and chemical resistant apron when cleaning mixing or loading.

Respiratory Protection: Not required

Ventilation: Mechanical ventilation should be used when handling this product in enclosed spaces.

Other: IMPORTANT. Read and observe all precautions and instructions on the label.

The information and statements herein are believed to be reliable but are not to be construed as a warranty or representation for which we assume legal responsibility. Users should undertake sufficient verification and testing to determine the suitability for their own particular purpose of any information or products referred to herein. NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE IS MADE.

Appendix D. List of known area beekeepers

David J. Huelsman	101 16 th St E, Williston, ND 58801-4334	701-577-0865
Clark Jenner	5042 133 rd Ave NW, Williston, ND 58801-9200	701-572-2907
David H. Nelson	1622 20 th Ave W, Williston, ND 58801-3724	701-572-9493

These people have been contacted via telephone by the Williston Area Vector Control District. The possible ramifications to their hives of one or a series of aerial adulticide applications were explained to them and they were told they would be contacted again before any applications occurred. It was also noted that the material used in the aerial larviciding would not affect the bees.

Appendix E. Climatological Information

Williston experiences a typical northern plains continental climate characterized by bitter cold winters and hot, dry summers. For more on the local climate refer to section 4.3 METEOROLOGICAL AND CLIMATOLOGICAL SETTING.

Appendix F. Threatened and Endangered Species

Currently there are two bird species on the Threatened List and one bird and one fish on the Endangered List found in the proposed treatment area. For specific information on these, refer to Table 5.7-1 Avian Food Preferences.

Appendix G. Coordination Comments

This project is to be coordinated through the office of Natural Resource Manager Jeffrey Keller of the U.S. Army Corps of Engineers located at Williston, ND. Technical Assistance will be provided by the Williston Area Vector Control District under Director Francis Bosch. This project will fall under the authority of the Flood Control Act of December of 1944.

Appendix H. Compliance Statements

for pertinent Environmental Statutes, Regulations, and Executive Orders

BALD AND GOLDEN EAGLE ACT 16 U.S.C. 668 ET SEQ.

The preferred alternative would not result in the destruction of nesting sites, or the taking of eagles, eagle parts, or feathers. The Fish and Wildlife Service, North Dakota Game and Fish Department, and the Army Corps of Engineers would be consulted before the spray operations as to the whereabouts of any nesting Bald and Golden Eagles. These sights, when and if identified, would be marked as a “no spray area”.

CLEAN AIR ACT AS AMENDED 42 U.S.C. 7401-7626

The purpose of this act is to protect public health and welfare by controlling the release of contaminants into the air. The preferred alternative is in compliance with the Clean Air Act as amended for the reasons set forth in Section 5.3, Consequences Relating to Air Quality.

CLEAN WATER ACT AS AMENDED 33 U.S.C. 1251, ET SEQ.

The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Because the preferred alternative calls for the application of less than the maximum label rate of the materials discussed, it is believed to be in compliance with the Clean Water Act as amended.

ENDANGERED SPECIES ACT AS AMENDED 16 U.S.C. 1531, ET SEQ.

This Act protects the continued existence of any threatened or endangered species and their critical habitats. Although the Piping Plover is a known insectivore, it also feeds upon crustaceans and mollusks. The preferred alternative may negatively impact insect availability on a temporary basis, however the other food sources would be unaffected. Although Pallid Sturgeon feed upon *chironimids*, which would be negatively affected, they also feed on a host of other aquatic insects and fish which would still be available. The Bald Eagle and the Least Tern are not anticipated to be affected by the preferred alternative due to their food sources. As mentioned earlier, the removal of the arbovirus vectors may improve the survivability of the endangered and threatened avian spp.

ENVIRONMENTAL JUSTICE EXECUTIVE ORDER 12898

The preferred alternative would not disproportionately impact minority or low income populations in the treatment area. The preferred alternative would actually improve conditions for those without proper housing by reducing mosquito based nuisance and disease vectors within the treatment area.

FARMLAND PROTECTION POLICY ACT 7 U.S.C. 4201-4209

This Act is not applicable because no farmland would be converted to non-agricultural uses by implementing this plan.

FEDERAL WATER PROJECT RECREATION ACT AS AMENDED 16 U.S.C. 460-1 ET SEQ.

The Act establishes the policy that consideration be given to the opportunities for outdoor recreation and fish and wildlife enhancement in investigating and planning of any Federal navigation, flood control, reclamation, hydroelectric, or multi-purpose water resource project, whenever any such project can reasonably serve either or both purposes consistently. Because this operation is neither planning nor investigating either of these operations this Act does not apply.

THE FISH AND WILDLIFE COORDINATION ACT 16 U.S.C. 661 ET SEQ.

This Act does not apply as there are no plans to modify bodies of water.

FLOOD PLAIN MANAGEMENT, EXECUTIVE ORDER 11988

This Executive Order does not apply because there would be no alteration of water through the flood plain.

THE MIGRATORY BIRD TREATY ACT OF 1918 16 U.S.C. 703-712

Some migratory bird species could possibly be affected by the temporary reduction in *chironomid* populations. However, as stated earlier the decrease in arbovirus vector populations could conceivably outweigh the negative impact of the temporary reduction of these prey species.

THE NATIONAL HISTORIC PRESERVATION ACT 16 U.S.C. 470A, ET SEQ.

This Act does not apply because there are no districts, sites, structures, or objects that are included or eligible for inclusion in the National Register of Historic Places that would be affected by the preferred alternative.

THE NATIONAL ENVIRONMENTAL POLICY ACT AS AMENDED 42 U.S.C. 4321, ET SEQ.

This environmental assessment has been prepared for the proposed action and a FONSI will be prepared pending Army Corps of Engineers review. Following the FONSI, an EIS would not be necessary given the findings.

THE NOISE CONTROL ACT OF 1972 42 U.S.C. 4901-4918

The preferred alternative is believed to be in compliance with this Act for the reasons shown in Section 5.6.

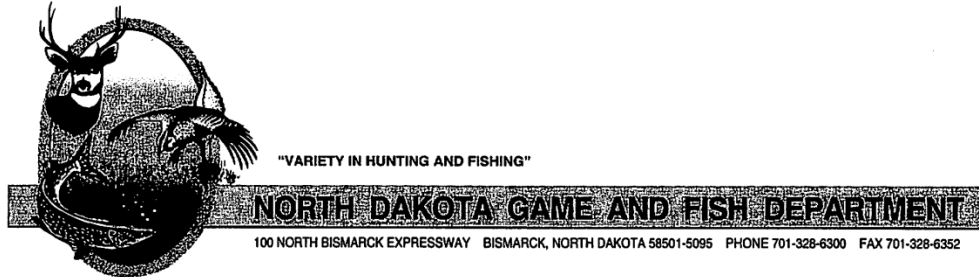
RIVERS AND HARBORS ACT 33 U.S.C. 401, ET SEQ.

Not applicable because the preferred alternative would not fall within the Act's ambit.

THE WILD AND SCENIC RIVERS ACT, AS AMENDED 16 U.S.C. 1271 ET SEQ.

This Act is not applicable since the Missouri River in North Dakota is not designated as a Wild or Scenic River.

Appendix I. **Letter concerning larvicides from Mike McKenna of the NDG&F Dept.**



January 13, 2009

Francis Bosch
Williston Vector Control District
PO Box 17
Williston, North Dakota 58801

Dear Mr. Bosch:

Re: City of Williston's Mosquito Spraying Contract

The North Dakota Game and Fish Department has received notification of the City of Williston and the Williston Vector Control District's proposal to spray large areas of the Missouri River flood plain with larvicides. The two larvicides being considered are methoprene (i.e. altocid) and *bacillus thuringiensis israelensis* (i.e. Bti). Methoprene is an insect growth regulator that prohibits mosquitoes from maturing to the adult stage of development while Bti is a naturally occurring bacterium that kills mosquitoes during the larval stage of development. Methoprene poses some hazards to freshwater invertebrates but reduced exposure is likely due to the chemical degrading rapidly in water. Whereas Bti is very specific for mosquitoes and black flies, it also has some toxicity toward certain other dipterans (including midges).

Keeping in mind Williston's dilemma with large mosquito populations, the Department reviewed the limited information available for both larvicides and recommends using methoprene on the majority of Department managed lands in either liquid or briquette form. However, the Department has concerns over the potential unintended impacts to chironomid populations within waterfowl production areas due to the mass application of larvicides. The Department wonders if over time (numerous years) the chironomid populations will gradually decrease due to larvicide applications impacting the food chain for duck production and other organisms? Therefore, on areas of high waterfowl use and production (specifically NDGF Lewis and Clark WMA -Wetland project, COE Ecology Park, COE Williston Marsh) we do not recommend use of methoprene in the briquette form, but suggest using methoprene in liquid form or Bti.

Because little is known about the base population of chironomids within these areas, the Department recommends the Vector Control District quantify chironomids within the identified high waterfowl use areas prior to applying any adulticide or larvicide and continue to monitor the populations throughout the summer and subsequent years. This information will allow for better future recommendations to control mosquito populations as well as reducing any impact to fish and wildlife

resources. A Special Use Permit from our Department will be necessary for any treatment or monitoring on Department Lands. Kent Luttschwager, Wildlife Resource Management Supervisor in our Williston District Office should be contacted at (701) 774-4320 regarding issuance of the Special Use Permit.

Sincerely,



Michael G. McKenna
Chief
Conservation & Communication Division

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Appendix J. Finding Of No Significant Impact (FONSI)
