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The Endrin RPAR

Lawrence S. Ebner
Sellers, Conner & Cuneo, Washington D.C.

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THE ENDRIN RPAR

Lawrence S. Ebner*

Sellers, Conner & Cuneo
1625 K Street, N.W.
Washington, D.C. 20006

In July, 1976 the U.S. Environmental Protection Agency issued a "Notice of Rebuttable Presumption Against Registration and Continued Registration of Pesticide Products Containing Endrin" (41 Fed. Reg. 31,316). The purpose of this Notice was to initiate an "RPAR" review to determine whether continued usage of endrin, including the use of endrin for vole control, poses a "substantial question of safety" necessitating cancellation proceedings under Section 6(b) of the Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA"). See 40 Fed. Reg. 28,254-28,257 (1975); see generally Environmental Defense Fund, Inc. v. Ruckelshaus, 439 F.2d 584, 593-4 (D.C. Cir. 1971).

The ensuing RPAR review of endrin has lasted more than two and one-half years and has inured directly to the public and to endrin users. The Agency, with the active participation of Velsicol Chemical Corporation (the sole domestic manufacturer of endrin), orchardists and farmers, extension agents, and other experts in disciplines as diverse as oncology, entomology; agricultural engineering, physical chemistry and biochemistry, wildlife biology, agronomy and pomology, has developed a comprehensive RPAR record which supports the following conclusions:

1. Endrin is not carcinogenic. Repeated testing in animals has revealed no oncogenic effects, and no human epidemiologic data have demonstrated that endrin is a human carcinogen.

2. Although endrin, like other biologically active chemicals generally, has low teratogenic potential in laboratory animals, proper usage of endrin in accordance with appropriate safety precautions does not pose a teratogenic hazard to women.

3. Agency approval of appropriate restricted-use safety precautions, such as a prohibition against orchard applications within 50 feet of ponds, lakes or streams, would help to protect humans and the natural environment from exposure to endrin and would enhance the safety of endrin usage while maintaining the efficacy of the pesticide.

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* B.A. 1969, Dartmouth College; J.D. 1972, Harvard Law School. The author represents Velsicol Chemical Corporation in the endrin RPAR proceeding.

As a result of the RPAR review of endrin, the Agency has proposed to retain usage of endrin for control of the "Eastern" pine vole and the "Western" meadow vole by certified applicators in accordance with appropriate restricted-use safety precautions and application directions. */

A unique aspect of the endrin RPAR was the development at Velsicol's behest of comprehensively revised, restricted-use endrin labeling reflective of state-of-the-art agricultural technologies for safe pesticide usage and application. This process began with the informational hearing on endrin conducted by the Agency in New Paltz on May 9, 1977 pursuant to Section 21(b) of FIFRA. Following an orchard tour which dramatically demonstrated the effects of pine vole damage, experts on the pine vole problem from Vermont to North Carolina presented emphatic testimony as to the extent of the problem and as to the need for continued availability of endrin until a better alternative is developed. These witnesses also expressed a renewed awareness that endrin must be used with discrimination and with keen regard for safety and for reduction of human and environmental exposure.

Shortly after the field hearing in New Paltz, Velsicol sought the advice of apple growers, pomologists, pesticide applicators and state regulatory personnel familiar with the use of endrin for vole control from New England to North Carolina and in the State of Washington as to how the endrin labeling could be improved. Although endrin was one of the first pesticides to be reclassified under Section 3(d) of FIFRA as a "restricted-use" pesticide for use by certified applicators only, both the Agency and Velsicol recognized the need for additional usage limitations, safety precautions and application directions. Accordingly, Velsicol requested each expert to describe how the apple orchard section of the Velsicol Endrin 1.6 EC label could be rewritten to minimize any risk of environmental contamination or exposure; to express directions, limitations on usage and warnings with greater clarity; to promote voluntary adherence to label directions and enforceability; and to maintain the efficacy of the pesticide.

The experts expressed their views on matters such as correct dilution and application rates; ground equipment specifications including nozzle pressures; verification of presence of infestations and avoidance of prophylactic usage; limitations on time of application (e.g., "Apply only after all apples, including drops intended for consumption,

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have been harvested"); distance restrictions from bodies of water (e.g., "Do not apply within 50 feet of bodies of water or wells"); container disposal; and posting and reentry practices. Although several of the experts disagreed on certain specifics, overall there was a consensus view on the major aspects of the label which enabled Velsicol to develop a comprehensive revision to the apple orchard section of the label. This revamped section of the endrin label was incorporated into the proposed comprehensively revised, restricted-use label for Endrin 1.6 EC which Velsicol submitted to the Agency in April, 1978 for consideration and approval (see Appendix 1).

In October, 1978 the Agency issued preliminary regulatory recommendations on endrin. With respect to the apple orchard uses of endrin, the Agency proposed to retain the "Eastern" pine vole and "Western" meadow vole uses, but to cancel the Eastern meadow vole use (the Agency has proposed to cancel the Eastern meadow vole use on the premise that zinc phosphide baits provide an acceptable alternative to endrin for that use). */

Furthermore, the Agency has specified the restricted-use labeling which will have to be adopted in connection with the Eastern pine vole and Western meadow vole uses (see Appendix 2). Although the Agency's proposed labeling incorporates many of the key provisions suggested by the experts and proposed to the Agency by Velsicol, there are also several significant deviations:

1. The Agency's proposal to include a warning specifically directed to female workers is unnecessary because substantial evidence in the RPAR record indicates there is an ample margin of safety between threshhold teratogenic effect levels in women and any exposure of pregnant women to endrin which could result from endrin applications in orchards.

2. Velsicol proposed to prohibit prophylactic usage of endrin. The Agency's proposed label language, however, merely is in the form of a warning and is not an emphatic enough deterrent against prophylactic usage.

3. The Agency's proposal to post ponds for one year following fish kills is arbitrary and quite possibly in-

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4. Protective clothing should be worn by men as well as women. This is because any hazards to applicators or field workers would be from acute exposure, not from a teratogenic hazard.

In its recent response to the Agency's preliminary recommendations, Velsicol urged the Administrator to reconsider the Agency's proposed label changes and to adopt Velsicol's proposed labeling before initiating final regulatory action.

It should be noted that USDI's Fish and Wildlife Service recently suggested that unless appropriate precautions are taken, usage of endrin in apple orchards could pose a secondary poisoning threat to bald eagles or to American or Arctic peregrine falcons. The Environmental Defense Fund supports this view. Velsicol has provided the Agency with information, however, indicating that these celebrated species are not likely to feed on endrin-poisoned mice in apple orchards. Furthermore, because endrin usage in orchards poses so few wildlife problems, it is unlikely that the avian species identified by the Fish and Wildlife Service would be able to find endrin-tainted wildlife upon which to feed.

In summary, the endrin RPAR has been a beneficial experience and has helped to ensure the future safe and efficacious usage of endrin for vole control in orchards.

Appendix 1

RESTRICTED USE PESTICIDE
FOR RETAIL SALE TO AND USE ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION AND ONLY FOR THOSE USES COVERED BY THE CERTIFIED APPLICATOR'S CERTIFICATION.

VELSICOL
ENDRIN 1.6 EC

AGRICULTURAL INSECTICIDE

Active Ingredients:

*Endrin	19.7%
Xylene	74.5%
Inert Ingredients	5.8%
TOTAL	100.0%

*Hexachloroepoxyoctahydro-endo, endo-dimethanonaphthalene

CONTAINS 1.6 POUNDS ENDRIN PER GALLON

KEEP OUT OF THE REACH OF CHILDREN

DANGER

See side panels for additional precautionary statements

E.P.A. Reg. No. 876-153-AA
E.P.A. Est. No.
NET CONTENTS:

POISON POISON

STATEMENT OF PRACTICAL TREATMENT

EXTERNAL— If spilled on skin: remove by washing with soap and water. Get medical attention if exposure has been extensive or prolonged.

If splashed in eyes: flush the eyes with clean water for 10 minutes. Get medical attention.

INTERNAL— If inhaled: remove victim to fresh air. Transport him immediately to emergency treatment facility.

If pesticide has just been swallowed, and victim is still fully conscious, evacuate the stomach by tickling the throat, or by giving 2 tablespoonsful of mustard in water, or 2 tablespoonsful of syrup of ipecac. Remove victim immediately to emergency treatment facility.

If victim is unconscious, clear the upper airway and administer mouth-to-mouth resuscitation. If heart beat is absent, administer cardiac resuscitation. Do not give anything by mouth. If convulsing, hold head back with jaw forward to keep upper airway clear. Transport immediately to emergency treatment facility, maintaining clear airway and artificial respiration.

VELSICOL CHEMICAL CORPORATION
341 East Ohio Street, Chicago, Illinois 60611

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER

POISON POISON

Information for Physicians

Endrin is a CNS depressant and hepatotoxin. Adequate dosage causes convulsions, respiratory depression, and liver damage. Impaired respiration must be supported by oxygen given by mechanical ventilation. Diazepam is useful in controlling convulsions. Intravenous glucose and B vitamins help to protect the liver. There is no specific antidote. Do not give vegetable oils or milk (which increase GI absorption). Large amounts of activated charcoal and saline laxatives help to limit GI absorption. Do not give adrenergic agents (myocardial irritability). Excretion of endrin from the body may require days or weeks.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS
DANGER

May be fatal if swallowed, inhaled or absorbed through eyes or skin. Do not get in eyes, on the skin, or on clothing. Wear goggles or face shield when handling. Do not breathe spray mist. Wear a pesticide respirator jointly approved by the Mining Enforcement and Safety Administration (formerly the U.S. Bureau of Mines) and by the National Institute for Occupational Safety and Health. Wash thoroughly after handling. Remove and wash contaminated clothing before reuse. Wear clean liquid-proof protective clothing, boots, hat and gloves.

ENVIRONMENTAL HAZARDS

This product is toxic to fish and wildlife. Birds feeding on treated areas may be killed. Do not apply closer than specified under limitations to any body of water or waterways or open water supply. Do not apply within 1/4 miles of human or domestic animal habitation or over highways. Do not apply within 12 hours preceding irrigation or when rainfall is imminent. Do not contaminate any water supply by application, cleaning of equipment or disposal of wastes resulting from empty containers or leftover spray liquids.

BENEFICIAL INSECT CAUTION

This pesticide is highly toxic to bees exposed to direct treatment or to residues remaining on the treated area. Do not apply when bees are actively visiting the crop, cover crop or weeds blooming in the treated area. Follow local regulations or recommendations regarding notification to beekeepers on applications to be made.

PHYSICAL OR CHEMICAL HAZARDS

DO NOT USE, POUR, SPILL, OR STORE NEAR HEAT OR OPEN FLAME.

Read "LIMIT OF WARRANTY AND LIABILITY" before buying or using. If terms are not acceptable, return at once unopened.

LIMIT OF WARRANTY AND LIABILITY

The exclusive remedy of the user or buyer and the limit of the liability of this company or any other seller for any and all losses, injuries or damages resulting from the use or handling of this product shall be the purchase price paid by the user or buyer for the quantity of the product involved. There is no warranty and this company and any other seller disclaim all liability for all losses, personal injuries or damages arising from combining substances and from any use of this product not recommended in label directions or arising from misuse, improper handling or improper storage.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling. This product may not be used against any pests not named on the label.

THIS PRODUCT MAY BE APPLIED UNDER THE DIRECT SUPERVISION OF A CERTIFIED APPLICATOR WHO IS NOT PHYSICALLY PRESENT AT THE SITE OF APPLICATION, BUT IS, NONETHELESS, AVAILABLE TO THE PERSON APPLYING THE PESTICIDE.

DO NOT USE IN ANY MANNER NOT SPECIFIED ON THIS LABEL. READ PRECAUTION STATEMENTS CAREFULLY BEFORE USING.

Mix the product into water by paddle agitation or by re-circulating the mixture through the spray pump and back to the tank. Closed mixing and loading equipment is desirable to reduce hazards to workers.

DIRECTIONS AND APPLICATION RATES

CROP	INSECTS	APPLICATION RATES AND TIMING ENDRIN 1.6 E.C.
COTTON*	Boll weevil, bollworm	Early season apply 1 pt./A. Late season apply 1-2 pts./A.
	Thrips, leafhoppers	Early season apply 3/8 pt./A. Mid season apply 3/4 pt./A. Late season apply 1 pt./A.
	Brown cotton leafworm, cabbage looper, celery leaftier, cotton leafworm, cutworms, garden webworm, leaf perforator, lygus bugs rapid plant bug, salt marsh caterpillar, tarnished plant bug	Apply when insects are present 1-2 pts./A. Repeat as necessary.
	Grasshoppers	Apply when necessary 1 1/4 pts./A.
	Fall armyworm	Apply when necessary 1-1 1/2 pts./A.
	Greenhouse leaftier	Apply when necessary 2 pts./A.
SMALL GRAIN** (barley, oats rye, wheat)	Armyworm, army cutworm, cutworm, fall armyworm, pale western cutworm.	Apply single application only 1-1 1/4 pts./A. when insects first appear.
	Chinch bugs	As above but may be applied either as barrier strip around field or broadcast
APPLES ***	Pine mice (pine vole)	Apply 10.5 - 12 pts./ treated A.[1] only when infestation is present and after all apples, including drops intended for consumption, have been harvested.
	Meadow mice (meadow vole)	Apply 6-7 pts./ treated A.[1] only when infestation is present and after all apples, including drops intended for consumption, have been harvested.

1. "Treated acre" is used in regard to orchard use to emphasize that orchard applications should be calculated on the basis of area treated from drip line to tree trunk.

LIMITATIONS

(on label will be placed below chart above. For draft it appears on next page).

LIMITATIONS

* COTTON - Workers entering treated fields within 5 days after application should be protected. Do not graze dairy animals or animals being finished for slaughter on treated fields. Do not apply within 1/4 mile of any body of water. Also see general re-entry statement. Apply by aircraft or ground equipment as described below.

** SMALL GRAINS - Make single application only. Do not apply within 45 days of harvest or feeding. Do not graze treated fields. Do not feed threshings to livestock. Do not apply within 1/4 mile of any body of water. Also see general re-entry statement. Apply by aircraft or ground equipment as described below.

*** APPLES - Apply only when infestation is present and after all apples, including drops intended for consumption, have been harvested. Do not apply within 50 ft. of any body of water or well or in orchards which are clean cultivated. Post and otherwise exclude entry to treated orchards for at least 30 days (orchard workers wearing protective clothing, however, may enter). Also see general re-entry statement. Apply by ground equipment only.

APPLICATION DIRECTIONS

GENERAL

Apply only when the wind velocity is less than 10 mph, but with a detectable (2 mph) wind speed and with a positive continuous direction. Use with caution when temperature inversion weather conditions exist, with warm air overhead, and low wind motion.

COTTON AND SMALL GRAINS (aircraft and ground applications)

Ground Applications.

For use with boom-nozzle ground equipment. Apply at not less than 5 gallons total mixture, water and chemical, per acre. Do not use nozzle liquid pressure at greater than 40 psi (pounds per square inch). Do not use fan nozzle size smaller than 0.2 gpm (gallons per minute) at 40 psi, or fan angle greater than 80 degrees, such as type 8002. Do not use cone nozzle size smaller than 0.15 gpm at 40 psi, such as type D2-25 or TX-10, or no other atomizer or nozzle giving smaller drop size.

Aircraft Application (and air-carrier ground equipment). Do not allow the pilot to mix, load or handle either the technical or the diluted spray mix. Automatic flagging equipment is desirable and if flagmen are used they must wear full protective clothing and respirators. Do not apply at less than 1 gallon total mixture, water and chemical, per acre. Do not operate nozzle liquid pressure over 40 psi (pounds per square inch) with no fan nozzle smaller than 0.4 gallons per minute (gpm) or fan angle greater than 65 degrees, such as type 6504. Do not use any cone type nozzles smaller than 0.4 gpm nor whirl plate smaller than #46, such as type D4-46, or any other atomizer or nozzle giving smaller drop size. All nozzles shall be directed with the airstream. Do not release this material at greater than 10 ft. height above the crop but with consideration for the ability to follow hilly fields.

APPLES (ground application only)

For control of pine mice (pine vole) mix 3 pints per 100 gallons of water. Use 350-400 gallons of diluted spray per treated acre. (This is equivalent to 12-14 gallons of diluted spray per 1,000 treated square feet). Apply with ground equipment using nozzle pressure below 300 p.s.i. and less than 100 p.s.i. whenever possible. Apply in a downward direction in a band extending from the tree trunk to the drip line and on both sides of the tree row. For newly planted or young trees, apply the diluted spray in a band not less than 7 ft. wide.

For control of meadow mice (meadow vole) mix 2 pints per 100 gallons of water. Use 300-350 gallons of diluted spray per treated acre. (This is equivalent to 10-12 gallons of diluted spray per 1,000 treated square feet). Apply with ground equipment using nozzle pressure below 300 p.s.i. and less than 100 p.s.i. whenever possible). Apply in a downward direction in a band extending from the tree trunk to the drip line and on both sides of the tree row. For newly planted or young trees, apply the diluted spray in a band not less than 7 ft. wide.

For control of mixed populations of pine mice and meadow mice, use as directed for pine mice.

STORAGE AND DISPOSAL

1. Prohibitions
Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Open dumping is prohibited. Do not reuse empty bags or fiber drums.

2. Pesticide Disposal
Pesticide, spray mixture or rinse water that cannot be used or chemically processed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies.

3. Container Disposal

SIZE	METAL CONTAINER	PLASTIC CONTAINER	FIBER DRUMS OR PAPER BAGS
Less than 30 gallons	Triple rinse, and offer for recycling, reconditioning, or disposal in approved landfill, or bury in a safe place.	Triple rinse and dispose in an incinerator or landfill approved for pesticide containers, or bury in a safe place.	Dispose of in an incinerator, or landfill approved for pesticide containers, or bury in a safe place.
30 gallons or larger	Reseal container and offer for reconditioning. OR Triple rinse and offer for recycling, reconditioning or disposal in an approved landfill, or bury in a safe place.		

4. General
Consult federal, state or local disposal authorities for approved alternatives.

USE RESTRICTIONS

Do not apply this material until evidence of insect infestation at damaging levels exists. Follow local recommendations for integrated pest management and field scouting.

Consult State Cooperative Extension Service and Agricultural Experiment Stations for additional information as to use of this product.

RE-ENTRY STATEMENT

Do not treat areas where unprotected humans or domestic animals are present or birds are feeding. Do not allow entry into treated fields earlier than specified under limitations unless full protective clothing is worn. Consult appropriate state regulatory officials for State Re-Entry Restrictions which take precedence if more restrictive than those stated on this label.

APPENDIX 2

[43 Fed. Reg. 51,137-51,138 (Nov. 2, 1978)]

Cancellation and denial of registration of endrin products for use in orchards to control the eastern meadow vole.

Cancellation and denial of registration of endrin products for use in orchards to control the pine vole and western meadow vole unless registrants or applicants for registration modify the terms or conditions of registration as follows:

Modification of the labeling of endrin products for use in orchards to control the pine vole and the western meadow vole to add the following:

Required Clothing for Female Workers

Female ground applicators, mixers and loaders, and flagpersons must wear long-sleeved shirts and long pants made of a closely woven fabric, and wide-brimmed hats. Mixers and loaders must also wear rubber or synthetic rubber boots and aprons.

Warning to Female Workers

Excessive exposure to endrin may cause birth defects. Female workers must be sure to wear all protective clothing and use all protective equipment specified on this label. In case of accidential spills or other unusual exposure, cease work immediately and follow directions for contact with endrin.

Application Restrictions

Do not apply this product within 50 feet of lakes, ponds or streams.

Do not apply this product within 50 feet of areas occupied by unprotected humans.

Do not apply when rainfall is imminent.

Procedures to be Followed if Fish Kills Occur

In case of fish kills, fish must be collected promptly and disposed of by burial. At ponds, post signs stating: "Contaminated: No Fishing." Signs must remain for 1 year after fish kill has occurred.

Equipment

Use a very coarse spray with minimum pressure necessary to penetrate ground cover. Do not apply as a fine spray. Power air blast equipment must be modified to meet the above application restriction. Consult the State recommendations for acceptable methods of adapting equipment.

Prophylactic Use

Unnecessary use of this product can lead to resistance in the mouse population and subsequent lack of efficacy.

Pests for Which this Product May Be Applied

This product may be applied to control the following pests only: Pine vole; western meadow vole.

As a result of the RPAR review of endrin, the Agency has proposed to retain usage of endrin for control of the "Eastern" pine vole and the "Western" meadow vole by certified applicators in accordance with appropriate restricted-use safety precautions and application directions. */

A unique aspect of the endrin RPAR was the development at Velsicol's behest of comprehensively revised, restricted-use endrin labeling reflective of state-of-the-art agricultural technologies for safe pesticide usage and application. This process began with the informational hearing on endrin conducted by the Agency in New Paltz on May 9, 1977 pursuant to Section 21(b) of FIFRA. Following an orchard tour which dramatically demonstrated the effects of pine vole damage, experts on the pine vole problem from Vermont to North Carolina presented emphatic testimony as to the extent of the problem and as to the need for continued availability of endrin until a better alternative is developed. These witnesses also expressed a renewed awareness that endrin must be used with discrimination and with keen regard for safety and for reduction of human and environmental exposure.

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ENDRIN 1.6 EC

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Inert Ingredients 5.8%
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KEEP OUT OF THE REACH OF CHILDREN

DANGER

See side panels for additional precautionary statements

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If splashed in eyes: flush the eyes with clean water for 10 minutes. Get medical attention.

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If pesticide has just been swallowed, and victim is still fully conscious, evacuate the stomach by tickling the throat, or by giving 2 tablespoonsful of mustard in water, or 2 tablespoonsful of syrup of ipecac. Remove victim immediately to emergency treatment facility.

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DANGER

May be fatal if swallowed, inhaled or absorbed through eyes or skin. Do not get in eyes, on the skin, or on clothing. Wear goggles or face shield when handling. Do not breathe spray mist. Wear a pesticide respirator jointly approved by the Mining Enforcement and Safety Administration (formerly the U.S. Bureau of Mines) and by the National Institute for Occupational Safety and Health. Wash thoroughly after handling. Remove and wash contaminated clothing before reuse. Wear clean liquid-proof protective clothing, boots, hat and gloves.

ENVIRONMENTAL HAZARDS

This product is toxic to fish and wildlife. Birds feeding on treated areas may be killed. Do not apply closer than specified under limitations to any body of water or waterways or open water supply. Do not apply within 1/4 miles of human or domestic animal habitation or over highways. Do not apply within 12 hours preceding irrigation or when rainfall is imminent. Do not contaminate any water supply by application, cleaning of equipment or disposal of wastes resulting from empty containers or leftover spray liquids.

BENEFICIAL INSECT CAUTION

This pesticide is highly toxic to bees exposed to direct treatment or to residues remaining on the treated area. Do not apply when bees are actively visiting the crop, cover crop or weeds blooming in the treated area. Follow local regulations or recommendations regarding notification to beekeepers on applications to be made.

PHYSICAL OR CHEMICAL HAZARDS

DO NOT USE, POUR, SPILL, OR STORE NEAR HEAT OR OPEN FLAME.

Read "LIMIT OF WARRANTY AND LIABILITY" before buying or using. If terms are not acceptable, return at once unopened.

LIMIT OF WARRANTY AND LIABILITY

The exclusive remedy of the user or buyer and the limit of the liability of this company or any other seller for any and all losses, injuries or damages resulting from the use or handling of this product shall be the purchase price paid by the user or buyer for the quantity of this product involved. There is no warranty and this company and any other seller disclaim all liability for all losses, personal injuries or damages arising from combining substances and from any use of this product not recommended in label directions or arising from misuse, improper handling or improper storage.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling. This product may not be used against any pests not named on the label.

THIS PRODUCT MAY BE APPLIED UNDER THE DIRECT SUPERVISION OF A CERTIFIED APPLICATOR WHO IS NOT PHYSICALLY PRESENT AT THE SITE OF APPLICATION, BUT IS, NONETHELESS, AVAILABLE TO THE PERSON APPLYING THE PESTICIDE.

DO NOT USE IN ANY MANNER NOT SPECIFIED ON THIS LABEL. READ PRECAUTION STATEMENTS CAREFULLY BEFORE USING.

Mix the product into water by paddle agitation or by recirculating the mixture through the spray pump and back to the tank. Closed mixing and loading equipment is desirable to reduce hazards to workers.

DIRECTIONS AND APPLICATION RATES

CROP	INSECTS	APPLICATION RATES AND TIMING ENDRIN 1.6 E.C.
COTTON*	Boll weevil, bollworm	Early season apply 1 pt./A. Late season apply 1-2 pts./A.
	Thrips, leafhoppers	Early season apply 3/8 pt./A. Mid season apply 3/4 pt./A. Late season apply 1 pt./A.
	Brown cotton leafworm, cabbage looper, celery leaftier, cotton leafworm, cutworms, garden webworm, leaf perforator, lygus bugs rapid plant bug, salt marsh caterpillar, tarnished plant bug	Apply when insects are present 1-2 pts./A. Repeat as necessary.
	Grasshoppers	Apply when necessary 1 1/4 pts./A.
	Fall armyworm	Apply when necessary 1-1 1/2 pts./A.
	Greenhouse leaftier	Apply when necessary 2 pts./A.
SMALL GRAIN** (barley, oats rye, wheat)	Armyworm, army cutworm, cutworm, fall armyworm, pale western cutworm.	Apply single application only 1-1 1/4 pts./A. when insects first appear.
	Chinch bugs	As above but may be applied either as barrier strip around field or broadcast
APPLES ***	Pine mice (pine vole)	Apply 10.5 - 12 pts./ treated A.[1] only when infestation is present and after all apples, including drops intended for consumption, have been harvested.
	Meadow mice (meadow vole)	Apply 6-7 pts./ treated A.[1] only when infestation is present and after all apples, including drops intended for consumption, have been harvested.

1. "Treated acre" is used in regard to orchard use to emphasize that orchard applications should be calculated on the basis of area treated from drip line to tree trunk.

LIMITATIONS

(on label will be placed below chart above. For draft it appears on next page).

LIMITATIONS

* COTTON - Workers entering treated fields within 5 days after application should be protected. Do not graze dairy animals or animals being finished for slaughter on treated fields. Do not apply within 1/4 mile of any body of water. Also see general re-entry statement. Apply by aircraft or ground equipment as described below.

** SMALL GRAINS - Make single application only. Do not apply within 45 days of harvest or feeding. Do not graze treated fields. Do not feed threshings to livestock. Do not apply within 1/4 mile of any body of water. Also see general re-entry statement. Apply by aircraft or ground equipment as described below.

*** APPLES - Apply only when infestation is present and after all apples, including drops intended for consumption, have been harvested. Do not apply within 50 ft. of any body of water or well or in orchards which are clean cultivated. Post and otherwise exclude entry to treated orchards for at least 30 days (orchard workers wearing protective clothing, however, may enter). Also see general re-entry statement. Apply by ground equipment only.

APPLICATION DIRECTIONS

GENERAL

Apply only when the wind velocity is less than 10 mph, but with a detectable (2 mph) wind speed and with a positive continuous direction. Use with caution when temperature inversion weather conditions exist, with warm air overhead, and low wind motion.

COTTON AND SMALL GRAINS (aircraft and ground applications)

Ground Applications.

For use with boom-nozzle ground equipment. Apply at not less than 5 gallons total mixture, water and chemical, per acre. Do not use nozzle liquid pressure at greater than 40 psi (pounds per square inch). Do not use fan nozzle size smaller than 0.2 gpm (gallons per minute) at 40 psi, or fan angle greater than 80 degrees, such as type 8002. Do not use cone nozzle size smaller than 0.15 gpm at 40 psi, such as type D2-25 or TX-10, or no other atomizer or nozzle giving smaller drop size.

Aircraft Application (and air-carrier ground equipment). Do not allow the pilot to mix, load or handle either the technical or the diluted spray mix. Automatic flagging equipment is desirable and if flagmen are used they must wear full protective clothing and respirators. Do not apply at less than 1 gallon total mixture, water and chemical, per acre. Do not operate nozzle liquid pressure over 40 psi (pounds per square inch) with no fan nozzle smaller than 0.4 gallons per minute (gpm) or fan angle greater than 65 degrees, such as type 6504. Do not use any cone type nozzles smaller than 0.4 gpm nor whirl plate smaller than #46, such as type D4-46, or any other atomizer or nozzle giving smaller drop size. All nozzles shall be directed with the airstream. Do not release this material at greater than 10 ft. height above the crop but with consideration for the ability to follow hilly fields.

APPLES (ground application only)

For control of pine mice (pine vole) mix 3 pints per 100 gallons of water. Use 350-400 gallons of diluted spray per treated acre. (This is equivalent to 12-14 gallons of diluted spray per 1,000 treated square feet). Apply with ground equipment using nozzle pressure below 300 p.s.i. and less than 100 p.s.i. whenever possible. Apply in a downward direction in a band extending from the tree trunk to the drip line and on both sides of the tree row. For newly planted or young trees, apply the diluted spray in a band not less than 7 ft. wide.

For control of meadow mice (meadow vole) mix 2 pints per 100 gallons of water. Use 300-350 gallons of diluted spray per treated acre. (This is equivalent to 10-12 gallons of diluted spray per 1,000 treated square feet). Apply with ground equipment using nozzle pressure below 300 p.s.i. and less than 100 p.s.i. whenever possible). Apply in a downward direction in a band extending from the tree trunk to the drip line and on both sides of the tree row. For newly planted or young trees, apply the diluted spray in a band not less than 7 ft. wide.

For control of mixed populations of pine mice and meadow mice, use as directed for pine mice.

STORAGE AND DISPOSAL

1. Prohibitions
Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Open dumping is prohibited. Do not reuse empty bags or fiber drums.

2. Pesticide Disposal
Pesticide, spray mixture or rinse water that cannot be used or chemically processed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies.

3. Container Disposal

SIZE	METAL CONTAINER	PLASTIC CONTAINER	FIBER DRUMS OR PAPER BAGS
Less than 30 gallons	Triple rinse, and offer for recycling, reconditioning, or disposal in approved landfill, or bury in a safe place.	Triple rinse and dispose in an incinerator or landfill approved for pesticide containers, or bury in a safe place.	Dispose of in an incinerator, or landfill approved for pesticide containers, or bury in a safe place.
30 gallons or larger	Reseal container and offer for reconditioning. OR Triple rinse and offer for recycling, reconditioning or disposal in an approved landfill, or bury in a safe place.		

4. General
Consult federal, state or local disposal authorities for approved alternatives.

USE RESTRICTIONS

Do not apply this material until evidence of insect infestation at damaging levels exists. Follow local recommendations for integrated pest management and field scouting.

Consult State Cooperative Extension Service and Agricultural Experiment Stations for additional information as to use of this product.

RE-ENTRY STATEMENT

Do not treat areas where unprotected humans or domestic animals are present or birds are feeding. Do not allow entry into treated fields earlier than specified under limitations unless full protective clothing is worn. Consult appropriate state regulatory officials for State Re-Entry Restrictions which take precedence if more restrictive than those stated on this label.

APPENDIX 2

[43 Fed. Reg. 51,137-51,138 (Nov. 2, 1978)]

Cancellation and denial of registration of endrin products for use in orchards to control the eastern meadow vole.

Cancellation and denial of registration of endrin products for use in orchards to control the pine vole and western meadow vole unless registrants or applicants for registration modify the terms or conditions of registration as follows:

Modification of the labeling of endrin products for use in orchards to control the pine vole and the western meadow vole to add the following:

REQUIRED CLOTHING FOR FEMALE WORKERS

Female ground applicators, mixers and loaders, and flagpersons must wear long-sleeved shirts and long pants made of a closely woven fabric, and wide-brimmed hats. Mixers and loaders must also wear rubber or synthetic rubber boots and aprons.

WARNING TO FEMALE WORKERS

Excessive exposure to endrin may cause birth defects. Female workers must be sure to wear all protective clothing and use all protective equipment specified on this label. In case of accidential spills or other unusual exposure, cease work immediately and follow directions for contact with endrin.

APPLICATION RESTRICTIONS

Do not apply this product within 50 feet of lakes, ponds or streams.

Do not apply this product within 50 feet of areas occupied by unprotected humans.

Do not apply when rainfall is imminent.

PROCEDURES TO BE FOLLOWED IF FISH KILLS OCCUR

In case of fish kills, fish must be collected promptly and disposed of by burial. At ponds, post signs stating: "Contaminated: No Fishing." Signs must remain for 1 year after fish kill has occurred.

EQUIPMENT

Use a very coarse spray with minimum pressure necessary to penetrate ground cover. Do not apply as a fine spray. Power air blast equipment must be modified to meet the above application restriction. Consult the State recommendations for acceptable methods of adapting equipment.

PROPHYLACTIC USE

Unnecessary use of this product can lead to resistance in the mouse population and subsequent lack of efficacy.

PESTS FOR WHICH THIS PRODUCT MAY BE APPLIED

This product may be applied to control the following pests only: Pine vole; western meadow vole.