MATERIAL SAFETY DATA SHEET

DATE PREPARED: 10/11/1996

MSDS No: 6019

SOLARIS

HomeDefense™ Ortho-Klor Soil Insect & Termite Killer

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: HomeDefense™ Ortho-Klor Soil Insect & Termite Killer

PRODUCT DESCRIPTION: Insecticide

MANUFACTURER

The SOLARIS Group

of Monsanto Company

P.O. Box 5008

San Ramon, CA 94583-0808

EPA REG. NO.: 239-2513A **PN:** 5522-D

24 HR. EMERGENCY TELEPHONE NUMBERS

Emergency Phone 800-454-2333

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Wt.%	CAS Registry #
Chlorpyrifos, Diethyl(trichloro-2-pyridyl)phosphorothioate	12 .6	2921-88-2
INERT INGREDIENTS	~ 87 .4 0	

``Inert Ingredients" is a term defined by the U.S. Environmental Protection Agency under the Federal Insecticide, Fungicide, and Rodenticide Act (40 CFR 158.153). It refers to any substance, other than an active ingredient, which is intentionally added to a pesticide product. Some inert ingredients may be hazardous chemicals, as defined by the Federal OSHA Hazard Communication Standard (29 CFR 1910.1200). The hazards associated with these inert ingredients have been included in this document.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear liquid

IMMEDIATE CONCERNS: - CAUSES EYE IRRITATION

- HARMFUL IF SWALLOWED
- DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING
- AVOID BREATHING VAPOR OR SPRAY MIST
- KEEP OUT OF REACH OF CHILDREN

POTENTIAL HEALTH EFFECTS

EYES: This substance is slightly irritating to the eyes. Eye contact may include discomfort, tearing, swelling, redness, and blurred vision. See section 11, Toxicological Information.

SKIN: The skin irritation potential of this substance has not been determined. However, it may be a moderate skin irritant so contact with the skin could cause prolonged (days) injury to the affected area. This may include discomfort, redness, swelling, and possibly blistering. The systemic toxicity of this substance has not been determined. However, it should be practically non-toxic to internal organs if it gets on the skin.

INGESTION: The oral toxicity of this substance has not been determined. However, it may be slightly toxic to internal organs if swallowed. The degree of injury will depend on the amount absorbed from the gut. This product containes a petroleum distillate. Due to the low viscosity of petroleum distillates, they can get directly into the lungs through aspiration either during swallowing or vomiting of the product.

INHALATION: The systemic toxicity of this substance has not been determined. However, it should be practically non-toxic to internal organs if inhaled.

TARGET ORGANS: Chlorpyrifos is an inhibitor of the cholinesterase enzyme, found in nervous tissue, red blood cells, and plasma.

COMMENTS HEALTH: Depending upon the extent and degree of overexposure to the product, signs and symptoms of cholinesterase inhibition can result following either ingestion, skin contact or inhalation routes of exposure. Signs and symptoms of cholinesterase inhibition can also result from either acute (one time), subchronic (repeated short-term) and chronic (daily life-time) overexposure to the product.

Signs and symptoms of cholinesterase inhibition usually occur within 12 hours following overexposure. These effects may include, but may not be limited to, headache, dizziness, weakness, nausea, vomiting, diarrhea, constriction of the pupil of the eye, blurred or dark vision, excessive salivation or nasal discharge, profuse sweating and abdominal cramps. Incontinence, unconsciousness, convulsions and breathing difficulties are indicative of severe poisoning. In untreated severe poisoning, death is due to respiratory failure or cardiac arrest.

This product also contains a petroleum distillate. Depending upon the degree of overexposure, the systemic toxicity of the product may be of less concern than the potential clinical complications that can result from aspiration of the petroleum distillate into the lungs if the product is either swallowed or vomited.

4. FIRST AID MEASURES

EYES: Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. Call a physician.

SKIN: If on skin, remove contaminated clothing, wash skin with plenty of soap and water. Wash contaminated clothing before reuse.

INGESTION: If swallowed, immediately telephone a poison control center, emergency treatment center or a physician for advice. DO NOT make person vomit unless directed to do so by medical personnel. If medical advice cannot be obtained, then immediately take person and product container, with label, to an emergency treatment center.

INHALATION: If respiratory discomfort or irritation occurs, move the person to fresh air. See a doctor if discomfort or irritation continues.

NOTES TO PHYSICIAN: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis. This material contains 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.

ADDITIONAL INFORMATION: Medical Information: Call day or night, 1-800-454-2333 OR 1-800-457-2022.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: 119°F TAG CC

EXTINGUISHING MEDIA: Alcohol Foam, CO2, Dry Chemical, Water Fog

HAZARDOUS COMBUSTION PRODUCTS: Exposure to heat or flame may produce hydrogen chloride, ethyl sulfide, diethyl sulfide and nitrogen oxides.

FIRE FIGHTING PROCEDURES: Products of combustion from fires involving this material may be toxic. Avoid breathing smoke and

mists. Avoid personnel and equipment contact with fallout and runoff. Minimize the amount of water used for fire fighting. Do not enter any enclosed area without full protective equipment, including self-contained breathing equipment. Keep containers cool with a water spray. Contain and isolate runoff and debris for proper disposal. Decontaminate personal protective equipment and fire fighting equipment before reuse. Read the entire document.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: While wearing rubber gloves, soak up spilled material with paper towels or other absorbent material and discard in trash. Product is highly flammable. Keep all sources of ignition away from spill.

LARGE SPILL: Eliminate all sources of ignition in vicinity of spill or released vapor.

Liquid spills on floor or other impervious surfaces should be contained or diked, and should be absorbed with attapulgite, bentonite or other absorbent material. Collect contaminated absorbent, place in plastic-lined metal drum and dispose of in accordance with instructions provided under Section 13. "DISPOSAL". Thoroughly scrub floor or other impervious surface with a strong industrial type detergent solution and rinse with water.

For liquid spills that soak into the ground, contact the applicable Federal, State and or County Health Dept. for disposal recommendations. If disposal is required then refer to Section 13 "DISPOSAL" for instructions.

Leaking containers should be separated from non-leakers and either the container or its contents transferred to a drum or other non-leaking container and disposed of in accordance with instructions provided under Section 13 "Disposal". Any recovered spilled liquid should be similarly collected and disposed of.

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

GENERAL PROCEDURES: Observe all protection and safety precautions when cleaning up spills -- see Section 8. "EXPOSURE CONTROLS/PERSONAL PROTECTION". For help with any spill, leak, fire or exposure involving this material, call day or night (800) 454-2333.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Avoid contamination of feed, foodstuffs and domestic water supplies. Store in a cool dry place, preferably in a locked storage area. Do not store diluted

spray. Store above freezing. Handle concentrate in a ventilated area. Keep container closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust systems.

PERSONAL PROTECTION

EYES AND FACE: For application of product diluted in accordance with label instructions, no special eye protection is needed.

Handling of the undiluted product is not likely to present an eye exposure concern during normal handling. In the event of an accidental discharge of the material during manufacture or handling which could cause eye contact, workers should wear goggles or a face shield.

SKIN: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type of glove for given application. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.

RESPIRATORY: Avoid breathing vapor or mist. Use NIOSH/MSHA approved respiratory protection equipment (full facepiece recommended) when airborne exposure limits are exceeded (see below). Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 C.F.R. 1910.134.

For application of product in accordance with label instructions, no special respiratory protection is required.

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200):

	EXPOSURE LIMITS		
Chemical Name	**OSHA PEL**	**ACGIH TLV**	**ACGIH STEL**
Diethyl(trichloro-2-pyridyl)phosphorothioate	0.2 mg/m3	0.2 mg/m3	None
Aromatic Hydrocarbon	100 ppm	100 ppm	150 ppm
Aliphatic Petroleum Distillates	500 ppm	None	None
Agent 296-74	None	None	None

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid

ODOR: Hydrocarbon Solvent

pH: No Data Available

SOLUBILITY IN WATER: Miscible with water.

COMMENTS:

DENSITY: 7.4 Lbs. per gallon @ 20øC

10. STABILITY AND REACTIVITY

STABLE: YES

HAZARDOUS POLYMERIZATION: NO

CONDITIONS TO AVOID: Avoid contact with alkaline materials.

HAZARDOUS DECOMPOSITION: Exposure to heat or flame may produce hydrogen chloride, ethyl sulfide, diethyl sulfide and nitrogen oxides.

INCOMPATIBLE MATERIALS: May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

11. TOXICOLOGICAL INFORMATION

ACUTE

EYES: Results of toxicology studies using a similar formulation indicate this product is moderate to severely irritating to eyes with all irritation clearing by day 7 (Rabbit). EPA FIFRA toxicity category - II.

DERMAL LD_{50}: Results of toxicology studies using a similar formulation indicate: Pratically non-toxic, (Rat LD50 >5000 mg/Kg). EPA FIFRA Toxicity Category - IV. Moderately irritating to skin (Rabbit). EPA FIFRA Toxicity Category - III.

ORAL LD_{50}: Results of toxicology studies using a similar formulation indicate: This product is slightly toxic if ingested. Rat LD50 = 1400 mg/kg (male), 1090 mg/kg (female). EPA FIFRA Toxicity Category - III.

INHALATION LC_{50}: No product toxicology data available. The hazard evaluation found in section 3, was based on data from similar materials.

SENSITIZATION: No product toxicology data available. Results of

guinea pig skin sensitization studies, using other chlorpyrifos formulations, were negative.

SUBCHRONIC: Results of subchronic oral toxicity studies in rats, mice, dogs and monkeys indicated that inhibition of plasma cholinesterase was the most sensitive indicator of overexposure followed by red blood cell and brain cholinesterase. Results of several rat 1-6 month oral toxicity studies revealed a no-observable-effect-level (NOEL) in the range of 0.1 mg/kg/day.

CARCINOGENICITY:

CARCINOGENICITY COMMENTS: Chlorpyrifos is not considered to be a carcinogen. There were no carcinogenic findings in any of the chronic animal toxicology investigations. The signs of systemic toxicity were primarily due to inhibition of cholinesterase.

Rat 2 year feeding study: The systemic NOEL was 1.0 mg/kg/day while the plasma and brain cholinesterase NOEL was 0.1 mg/kg/day.

Mouse 2 year feeding study: There were no systemic effects noted at the high dose of 2.25 mg/kg/day (NOEL). Cholinesterase was not measured in the study.

Dog 2 year feeding study: The systemic NOEL was 1.0 mg/kg/day while the cholinesterase NOEL's were 0.01, 0.1 and 1.0 mg/kg/day for the plasma, red blood cell and brain cholinesterase, respectively.

NEUROTOXICITY: Chlorpyrifos is not considered to produce organophosphate induced delayed neuropathy. However, certain human anecdotal cases, involving the ingestion of lethal doses of chlorpyrifos, survived because of immediate aggressive antidotal therapy and respiratory support, later developed temporary signs of neuropathy.

Chicken: Dose levels of 100 and 300 mg/kg resulted in 34% and 70% inhibition of brain neurotoxic esterase (NTE), respectively. No neuropathology was conducted.

TERATOGENICITY: Chlorpyrifos in not considered to be a teratogen (a substance that causes birth defects).

Rats: Results of 2 rat teratology studies indicated that there was no evidence of maternal toxicity or developmental effects at dose levels of 0.1 - 2.5 mg/kg/day.

Mice: Developmental NOEL greater than 25 mg/kg/day (highest dose tested), even though severe maternal toxicity was observed at this dose.

Rabbit: Maternal and developmental NOEL = 81 mg/kg/day.

REPRODUCTIVE TOXIN: Chlorpyrifos is not considered to be a reproductive toxin.

Rats: No adverse reproductive effects were observed in a 3-generation dietary study (high dose 1.0 mg/kg/day).

MUTAGENICITY: Chlorpyrifos is not considered to be a mutagen. Results of several mutagenicity studies were negative, e.g. Ames test, Chinese hamster ovary cell mutation assays, micronucleus assay for chromosomal aberrations, in vitro chromosomal aberration assay with and without enzymatic activation and unscheduled DNA synthesis assay.

COMMENTS: See Section 16 for definition of EPA FIFRA toxicity categories.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA: No data available.

ECOTOXICOLOGICAL INFORMATION: This material is toxic to fish, birds and other wildlife. Do not apply directly to water. Do not contaminate water by cleaning of equipment or disposal of wastes.

13. DISPOSAL CONSIDERATIONS

FOR LARGE SPILLS: Material collected that cannot be reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, State or local procedures.

PRODUCT DISPOSAL: The Solaris Group is committed to responsible environmental practices and recommends that all of the product be used up, carefully following all label directions and precautions.

If necessary to dispose of partially filled product container, then securely wrap it in several layers of newspaper and discard in trash.

EMPTY CONTAINER: Do not reuse container. Rinse throughly before discarding in trash.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: Consumer Commodity, ORM-D, RQ (Chlorpyrifos)

PRIMARY HAZARD CLASS/DIVISION: ORM-D

UN/NA NUMBER: NONE

PACKING GROUP: NO

U.S. SURFACE FREIGHT CLASS: NMFC NBR. 102120

AIR (ICAO/IATA)

PROPER SHIPPING NAME: Consumer Commodity

VESSEL (IMO/IMDG)

MARINE POLLUTANT #1: Chlorpyrifos (Severe Marine Pollutant)

SPECIAL SHIPPING NOTES: The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

PRODUCT CLASSIFICATION UNDER SECTION 311 OF SARA				
ACUTE:	CHRONIC:	FIRE:	REACTIVITY:	PRESSURE GENERATING:
YES	NO	YES	NO	NO

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA RQ: 1 Lb. of Chlorpyrifos

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA REGULATORY: All non FIFRA regulated components are on the US EPA's TSCA Inventory List.

16. OTHER INFORMATION

HMIS CODES

FIRE: 2 **HEALTH:** 1 **REACTIVITY:** 0 **PROTECTION:** -

NFPA CODES

FIRE: 2 **HEALTH:** 1 **REACTIVITY:** 0 **SPECIAL:** -

APPROVAL DATE: 11/18/1996

REVISION SUMMARY Revision #: 2

This MSDS replaces the November 18, 1996 MSDS. Any changes in information are as follows:

In Section 3
Chronic Effects (text)

MANUFACTURER SUPPLEMENTAL NOTES: EPA FIFRA (Federal Insecticide, Fungicide and Rodenticide Act) Toxicity Categories: The EPA toxicity categories are based on the results of the acute toxicology studies. The toxicology findings are compared to the FIFRA criteria to determine the product label signal word, precautionary and first aid statements. The EPA FIFRA toxicity category summary:

EPA FIFRA Product Label Toxicity Rating
Toxicity Category Signal Word

I DANGER Most toxic and irritating
II WARNING
III CAUTION
IV CAUTION Least toxic and irritating

COMMENTS: For additional information concerning this product, call the SOLARIS Groups Consumer Helpline at 800-225-2883.

MANUFACTURER DISCLAIMER: This Material Safety Data Sheet (MSDS) contains health, safety and environmental information for you and your employees. It does not replace the precautionary language, use directions, or the storage and disposal information found on the product label. Information contained in this MSDS will help you to prepare for emergency response and to meet community right-to-know, emergency response and reporting requirements under SARA Title III and many other laws. Emergency response agencies and health care providers will also find this additional information useful.

Use of this product is regulated by the U.S. Environmental Protection Agency (EPA) through the approved label copy. It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Although the information and recommendations set forth herein (herinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Monsanto Company and The Solaris Group make no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determinations as to its suitability for their purposees prior to use. In no event will Monsanto Company or The Solaris Group be responsible for damages of any nature whatsoever resulting from the use of

or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.