1. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME........: DI-SYSTON 8 Emulsifiable Systemic Insecticide
PRODUCT CODE........: 11057
CHEMICAL FAMILY.....: Organophosphorous Insecticide
CHEMICAL NAME.......: O,O-Diethyl S-(2-(ethylthio)ethyl) phosphorodithioate
SYNONYMS............: Disulfoton
FORMULA.............: C_{8} H_{19} O_{2} P S_{3}
EPA Registration No.: 264-734

2. COMPOSITION/INFORMATION ON INGREDIENTS:

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>/CAS NUMBER</th>
<th>EXPOSURE LIMITS</th>
<th>CONCENTRATION (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>**** HAZARDOUS INGREDIENTS ****</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DI-SYSTON (disulfoton)
298-04-4 
OSHA : .10 mg/m3 TWA 
ACGIH: .10 mg/m3 TWA
85.0 %

Ingredient 1946
Specific chemical identity is withheld as a trade secret.
OSHA : Not Established
ACGIH: Not Established
3-5 %

Ingredient 1929
Specific chemical identity is withheld as a trade secret.
OSHA : Not Established
ACGIH: Not Established
1-3 %
2. COMPOSITION/INFORMATION ON INGREDIENTS (Continued)

<table>
<thead>
<tr>
<th>INGREDIENT NAME /CAS NUMBER</th>
<th>EXPOSURE LIMITS</th>
<th>CONCENTRATION (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredient 2441</td>
<td>OSHA: Not Established</td>
<td>1-3 %</td>
</tr>
<tr>
<td></td>
<td>ACGIH: Not Established</td>
<td></td>
</tr>
<tr>
<td>Ingredient 1330 may be contained in this product as an alternate to Ingredient 2441.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ingredient 1510

Specific chemical identity is withheld as a trade secret.

OSHA : Not Established                         3-5 %
ACGIH: Not Established

Ingredient 1510

Specific chemical identity is withheld as a trade secret.

OSHA : Not Established                         3-5 %
ACGIH: Not Established

3. HAZARDS IDENTIFICATION:

*****************************************************************
*                     EMERGENCY OVERVIEW                        *
*                                                               *
* DANGER!  Toxic;  Color: Colorless - light yellow;  Form:      *
*Liquid; Clear;  Odor: Aromatic solvent; slightly garlic;      *
*Organophosphate Insecticide - Cholinesterase Inhibitor; May   *
*be harmful if inhaled; May be harmful if absorbed through     *
*skin; May be harmful if swallowed.                           *
*****************************************************************

POTENTIAL HEALTH EFFECTS:

ROUTE(S) OF ENTRY: Inhalation; Skin Contact; Skin Absorption; Eye Contact

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE EFFECTS OF EXPOSURE: This material is highly toxic by the oral and dermal routes of exposure, and is readily absorbed through the mucous membrane of the eye and through the skin. Inhalation, dermal absorption or ingestion of this material may result in systemic intoxication due to inhibition of the enzyme cholinesterase. The sequence of development of systemic effects varies with the route of entry, and the onset of symptoms may be delayed up to 12 hours. First symptoms of poisoning may be nausea, increased salivation, lacrimation, blurred vision and constricted pupils. Other symptoms of systemic poisoning include vomiting, diarrhea, abdominal cramping, dizziness and sweating. After inhalation, respiratory symptoms like tightness of chest, wheezing, and laryngeal spasms, may be pronounced at first. If the poisoning is severe, then symptoms of weakness, muscle twitching, confusion, ataxia, slurred speech, convulsions, low blood pressure, cardiac irregularities, loss of reflexes and coma may occur. In extreme cases, death may occur due to a combination of factors such as respiratory arrest, paralysis of respiratory muscles or intense bronchoconstriction. Complete symptomatic recovery from sublethal poisoning usually occurs within one week once the source of exposure is
3. HAZARDS IDENTIFICATION (Continued)

completely removed. This product contains aromatic hydrocarbon solvents. High vapor concentrations (greater than approximately 1000 ppm) can be irritating to the eyes, nose and throat, and may cause headaches, dizziness, nausea, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

CHRONIC EFFECTS OF EXPOSURE...: Cholinesterase inhibition sometimes persists for 2-6 weeks, thus repeated exposure to small amount of this material may result in an unexpected cholinesterase depression causing symptoms such as malaise, weakness, and anorexia that resemble other illnesses such as influenza. Exposure to a concentration that would not have produced symptoms in a person that was not previously exposed may produce severe symptoms of cholinesterase inhibition in a previously exposed person. Repeated skin contact can result in defatting of the skin by the solvents in the product which may lead to redness and irritation of the skin. Chronic overexposure to these solvent components may cause mucous membrane irritation, nausea, headache, loss of appetite, weakness and alcohol intolerance.

CARCINOGENICITY............: This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

MEDICAL CONDITIONS
AGGRAVATED BY EXPOSURE......: No specific medical conditions are known which may be aggravated by exposure to the active ingredient in this product. However, any disease, medication or prior exposure which reduces normal cholinesterase activity may increase susceptibility to the toxic effects of the active ingredient. In addition, certain pre-existing skin disorders may be aggravated by exposure to this product due to the solvent components.

4. FIRST AID MEASURES:

FIRST AID FOR 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. Call a poison control center or doctor for treatment advice.
FIRST AID FOR SKIN.......: 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.
FIRST AID FOR INHALATION: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, is possible. Call a poison control center or doctor for further treatment advice.
FIRST AID FOR INGESTION.: Call poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by physician or poison control center. Do not give anything by mouth to an unconscious person.
4. FIRST AID MEASURES (Continued)

NOTE TO PHYSICIAN.......: This product contains the organophosphorus insecticide disulfoton, a cholinesterase inhibitor. Cholinesterase inhibition results in stimulation of the central nervous system, the parasympathetic nervous system and the somatic motor nerves. If symptoms of organophosphate poisoning are present, the administration of atropine sulfate is indicated. Administer atropine sulfate in large therapeutic doses. In mild cases, start treatment by giving 1-2 mg of atropine intravenously every 15 minutes until signs of atropinization appear (dry mouth, flushing, and dilated pupils if pupils were originally pinpoint). In severe cases, start treatment by giving 2-4 mg intravenously every 5-10 minutes until fully atropinized. Dosages for children should be appropriately reduced. 2-PAM is also antidotal and may be used in conjunction with atropine. Do not give morphine. Watch for pulmonary edema which may develop in serious cases of poisoning even after 24 hours. At first sign of pulmonary edema, place in an oxygen tent and treat symptomatically. In case of poisoning, call the emergency number on page 1.

5. FIRE FIGHTING MEASURES:

FLASH POINT.................: 194 F (Setaflash)
FLAMMABLE LIMITS:
   UPPER EXPLOSIVE LIMIT (UEL)(%): Not established
   LOWER EXPLOSIVE LIMIT (LEL)(%): Not established
EXTINGUISHING MEDIA..........: Water; Carbon Dioxide; Dry Chemical; Foam
SPECIAL FIRE FIGHTING PROCEDURES: Keep out of smoke; cool exposed containers with water spray. Fight fire from upwind position. Use self-contained breathing equipment. Contain runoff by diking to prevent entry into sewers or waterways. Equipment or materials involved in pesticide fires may become contaminated.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES........: Isolate area and keep unauthorized people away. Do not walk through spilled material. Avoid breathing vapors and skin contact. Remove sources of ignition if combustible or flammable vapors may be present and ventilate area. Wear proper protective equipment. Dike contaminated area with absorbent granules, soil, sand, etc. If large spill, material should be recovered. Small spills can be absorbed with absorbent granules, spill control pads, or any absorbent materials. Wear proper protective equipment. Carefully sweep up spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with soap and water. Use dry absorbent material such as clay granules to absorb and collect wash solution for proper disposal.
6. ACCIDENTAL RELEASE MEASURES (Continued)

Contaminated soil may have to be removed and disposed. Do not allow material to enter streams, sewers, or other waterways or contact vegetation.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE (MIN/MAX): 0 F/ 30-day average not to exceed 100 F
SHELF LIFE: Time/temperature-dependent. Contact Bayer for additional information.
SPECIAL SENSITIVITY: Heat, Moisture
HANDLING/STORAGE PRECAUTIONS: Store in a cool dry area. Store away from excessive heat and open flame. Store in an area designated specifically for pesticides. Do not store near any materials intended for use or consumption by humans or animals.

8. PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS: Goggles or a faceshield should be used when needed to prevent liquid splashes from getting into the eyes.
SKIN PROTECTION REQUIREMENTS: Avoid skin contact. Use chemical-resistant (such as viton, barrier laminate or nitrile) gloves, boots or shoe covers, and apron to prevent dermal exposure.
VENTILATION REQUIREMENTS: Maintain exposure levels below the applicable exposure limits through the use of general and local exhaust ventilation.
RESPIRATOR REQUIREMENTS: Wear a NIOSH-approved organic vapor respirator with particulate pre-filter.
MEDICAL SURVEILLANCE: Plasma and/or red blood cell cholinesterase activity can be used to detect excessive absorption of disulfoton. It is preferable to establish a pre-exposure baseline value for best comparisons. Contact Bayer CropScience, Agriculture Division, for additional information. If significant cholinesterase depression occurs, no further exposure should be allowed until cholinesterase values return to normal.
ADDITIONAL PROTECTIVE MEASURES: Clean water should be available for washing in case of eye or skin contamination. Educate and train employees in safe use of the product. Follow all label instructions. Launder clothing separately after use. Wash thoroughly after handling.
9. PHYSICAL AND CHEMICAL PROPERTIES:

- PHYSICAL FORM: Liquid
- APPEARANCE: Clear
- COLOR: Colorless - light yellow
- ODOR: Aromatic solvent; slightly garlic
- ODOR THRESHOLD: Not established
- MOLECULAR WEIGHT: 274.4 (for disulfoton)
- pH: Not established
- BOILING POINT: Not established
- MELTING/FREEZING POINT: Less than 0 C
- SOLUBILITY IN WATER: 12 ppm (for disulfoton)
- SPECIFIC GRAVITY: 1.12 @ 20 C
- BULK DENSITY: Not established
- % VOLATILE BY VOLUME: Not established
- VAPOR PRESSURE: 5.4 x 10^-5 mm Hg @ 20 C (for disulfoton)
- VAPOR DENSITY: Not established (Air = 1)

10. STABILITY AND REACTIVITY:

- STABILITY: This is a stable material.
- HAZARDOUS POLYMERIZATION: Will not occur.
- INCOMPATIBILITIES: Oxidizing agents and bases
- INSTABILITY CONDITIONS: Sustained temperatures above 100 F
- DECOMPOSITION PRODUCTS: Proposed compounds due to fire or other extreme conditions: SO2, H3PO4, CO, C2H5SH, diethyl disulfide

11. TOXICOLOGICAL INFORMATION:

Toxicity studies have not been performed on this product as formulated. The acute toxicity data provided have been extrapolated from a similar formulation of DI-SYSTON 8. The non-acute information pertains to the active ingredient, disulfoton.

ACUTE TOXICITY
- ORAL LD50: Male Rat: 12.7 mg/kg - Female Rat: 3.3 mg/kg
- DERMAL LD50: Male Rabbit: 9.2 mg/kg - Female Rabbit: 16.9 mg/kg
- INHALATION LC50: 1 HR Exposure to Liquid Aerosol: Male Rat: 0.170 mg/L (analytical) - Female Rat: 0.032 mg/L (analytical)
- EYE EFFECTS: This product is highly toxic and can be readily absorbed through the mucous membranes of the eye.
- SKIN EFFECTS: This product is highly toxic and is readily absorbed through the skin.
11. TOXICOLOGICAL INFORMATION (Continued)

SENSITIZATION......: Guinea Pig: Dermal sensitization studies have not been performed on this formulation; however, the active ingredient, disulfoton, is not a dermal sensitizer.

SUBCHRONIC TOXICITY....: In a 13 week inhalation study, rats were exposed to disulfoton for 6 hours/day, 5 days/week at mean analytical concentrations of 0.018, 0.16 or 1.4 mg/m³. At the highest concentration, compound-related effects included cholinesterase inhibition and an increased incidence of inflammation of the nasal turbinates. The no-observed-effect-level (NOEL) was 0.16 mg/m³. In dermal toxicity studies, disulfoton was administered to the back of rabbits for 6 hours/day, 5 days/week for 3 weeks at levels ranging from 0.4 up to 6.5 mg/kg. Cholinergic symptoms including muscle spasms, tremors, salivation, and difficult breathing were observed in rabbits at 3.0 mg/kg and greater. Mortality also occurred at these levels. The NOEL for these studies was 0.8 mg/kg based on cholinesterase inhibition.

CHRONIC TOXICITY......: In a 1 year study, dogs were administered disulfoton at dietary concentrations of 0.5, 4 or 12 ppm. The only significant effects observed in the study were the inhibition of cholinesterase activities. The NOEL was 0.5 ppm on the basis of cholinesterase inhibition. Disulfoton was administered to rats at dietary concentrations of 1, 4 or 16 ppm for 2 years. Effects observed at the high dose included decreased food consumption, decreased body weight gain, cholinesterase inhibition, eye effects and increased mortality. The NOEL for systemic effects was 4 ppm. In a subsequent 6 month study in which rats were administered disulfoton at dietary concentrations of 0.25, 0.5 or 1.0 ppm, the overall NOEL for cholinesterase inhibition was 0.5 ppm.

CARCINOGENICITY.......: Disulfoton was investigated for carcinogenicity in chronic feeding studies using rats and mice. There was no evidence of a carcinogenic effect in either species at dose levels up to and including 16 ppm, the highest dose tested.

MUTAGENICITY..........: A number of mutagenicity studies have been conducted on disulfoton. Three in vitro studies showed disulfoton to be a potential mutagen, however, these results were not substantiated in vivo testing.

DEVELOPMENTAL TOXICITY: In a rat teratology study, disulfoton was administered during gestation at oral doses of 0.1, 0.3 or 1.0 mg/kg/day. Maternal cholinesterase inhibition occurred at 0.3 mg/kg and greater. At the maternally toxic dose of 1.0 mg/kg, there was an increased incidence of incomplete ossification of the sternebrae in fetuses. The NOELs for maternal and developmental toxicity were 0.1 and 0.3 mg/kg/day, respectively. Teratogenic effects were not found at any of the levels tested. Rabbits were administered disulfoton during gestation at oral doses of 0.3, 1.0 or 3.0 mg/kg/day. Due to severe toxic responses and deaths at 3.0 mg/kg, this dose was lowered to 2.0 and later for most animals again to 1.5 mg/kg/day. The NOEL for maternal toxicity was 1.0 mg/kg/day. There was no evidence of disulfoton causing a teratogenic or an embryotoxic effect up to the highest dose tested.

REPRODUCTION..........: In a two-generation reproductive toxicity study, disulfoton was administered to rats at dietary concentrations of 0.5, 2 or 9 ppm. Reproductive and litter effects occurring in conjunction with severe maternal toxicity were observed at the high-dose. These effects included cannibalism, decreased pup body weight, decreased litter size, decreased median number of implantations and effects on cholinesterase activities. The
NOELs for parental and reproductive toxicity were 0.5 and 2 ppm, respectively.

NEUROTOXICITY: In an acute oral neurotoxicity study using rats, disulfoton was administered as a single dose to males at 0.24, 1.5 or 5.2 mg/kg and to females at 0.24, 0.76 or 1.5 mg/kg. Clinical observations and neurotoxicity evaluations were performed over a period of 15 days followed by neurohistopathological examination. There was no evidence of neurotoxicity in either sex at any of the dose levels tested. In a supplemental cholinesterase activity study using rats, disulfoton was administered as a single oral dose to males at 0.25, 1.5 or 4.9 mg/kg and to females at 0.25, 0.77 or 1.5 mg/kg. The NOEL for cholinesterase inhibition was 0.25 mg/kg in both sexes. In a 13 week neurotoxicity screening study, disulfoton was administered to rats at dietary concentrations of 0.9, 3.8 and 14.5 ppm. There were behavioral and clinical biochemical evidence of cholinergic toxicity but no evidence of a neurotoxic effect in rats at dietary concentrations up to and including 14.5 ppm, the highest concentration tested. There was no evidence of acute delayed neurotoxicity in antidote protected hens treated with disulfoton at an oral dose exceeding the LD50 in hens.

ECOLOGICAL INFORMATION:

This product is toxic to fish and wildlife. Bayer will provide a summary of specific data upon written request. As with any pesticide, this product should be used according to label directions and should be kept out of streams, lakes and other aquatic habitats of concern. In event of a spill emergency, call the emergency number on page 1.

DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Follow container label instructions for disposal of wastes generated during use in compliance with the FIFRA product label. In other situations, dispose in a RCRA hazardous waste incinerator. EMPTY CONTAINER PRECAUTIONS: Do not reuse the container without written approval from Bayer CropScience. When empty, the container is a RCRA hazardous waste and must be managed as a RCRA hazardous waste until it is triple rinsed or cleaned by an equivalent method. Any cleaning residues must be managed as a RCRA hazardous waste. Triple rinsed and clean containers should be disposed in compliance with applicable state and local laws.
14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME........: Disulfoton - 85%
FREIGHT CLASS BULK...............: Insecticides, NOI - NMFC 102100
FREIGHT CLASS PACKAGE............: Insecticides, NOI - NMFC 102100
PRODUCT LABEL..................: Di-Syston 8

DOT (DOMESTIC SURFACE)

PROPER SHIPPING NAME...........: Organophosphorus Pesticides, Liquid, Toxic*
HAZARD CLASS OR DIVISION ......: 6.1
UN/NA NUMBER....................: UN3018
PACKING GROUP ..................: I
HAZARDOUS SUBSTANCE............: Disulfoton
DOT PRODUCT RQ lbs (kgs).......: 1.2 lbs (0.5 kgs)
HAZARD LABEL(s)................: Toxic
HAZARD PLACARD(s)..............: Toxic

*Only bulk packages (greater than 119 gallons) are regulated as marine pollutants when shipped by highway or rail. 49 CFR 171.4(c).

IMO / IMDG CODE (OCEAN)

PROPER SHIPPING NAME...........: Organophosphorus Pesticides, Liquid, Toxic
HAZARD CLASS DIVISION NUMBER...: 6.1
UN NUMBER.......................: UN3018
ADDITIONAL IMO INFORMATION....: Marine Pollutant
PACKAGING GROUP..................: I
HAZARD LABEL(s)................: Toxic; Marine Pollutant (Mark)
HAZARD PLACARD(s)..............: Toxic; Marine Pollutant

ICAO / IATA (AIR)

PROPER SHIPPING NAME...........: Organophosphorus Pesticides, Liquid, Toxic
HAZARD CLASS DIVISION NUMBER...: 6.1
UN NUMBER.......................: UN3018
SUBSIDIARY RISK..................: None
PACKING GROUP...................: I
HAZARD LABEL(s)................: Toxic
RADIOACTIVE?.....................: Non-Radioactive
PASSENGER AIR - MAX. QTY. ......: 1 L
PASSENGER PACKING INSTRUCTION.: 603
CARGO AIR - MAX. QTY. .........: 30 L
CARGO AIR PACKING INSTRUCTION.: 604

Product Code: 11057               MSDS Page 9
Approval date: 03/13/2003         Continued on next page
15. REGULATORY INFORMATION:

OSHA STATUS.............: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA STATUS.............: This product is exempt from TSCA Regulation under FIFRA Section 3 (2)(B)(ii) when used as a pesticide.

CERCLA REPORTABLE QUANTITY..: 1.2 pounds of the formulation which contains 1 pound of Disulfoton.

SARA TITLE III:
SECTION 302 EXTREMELY
HAZARDOUS SUBSTANCES...: Disulfoton CAS #298-04-4 85%

SECTION 311/312
HAZARD CATEGORIES......: Immediate Health Hazard; Delayed Health Hazard

SECTION 313
TOXIC CHEMICALS.......: No components listed

RCRA STATUS.............: When discarded in its purchased form, this product is a listed RCRA hazardous waste and should be managed as a hazardous waste. (40 CFR 261.20-24)

16. OTHER INFORMATION:

NFPA 704M RATINGS: Health Flammability Reactivity Other
4 2 1
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

Bayer’s method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. NFPA ratings are provided by Bayer as a customer service.

REASON FOR ISSUE.........: Revise address, telephone numbers, and new EPA Reg. No.
PREPARED BY..............: T. M. Myers
APPROVED BY..............: S. E. Earnest
TITLE....................: Manager, Quality Systems Services
APPROVAL DATE...........: 03/13/2003
SUPERSEDES DATE.........: 01/30/2001
MSDS NUMBER.............: 18391

Product Code: 11057 MSDS Page 10
Approval date: 03/13/2003 Continued on next page