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# Oryzalin

## HERBICIDE FACT SHEET

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U.S. DEPARTMENT OF ENERGY  
BONNEVILLE POWER ADMINISTRATION

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This fact sheet is one of a series issued by the Bonneville Power Administration for their workers and the general public. It provides information on forest and land management uses, environmental and human health effects, and safety precautions. A list of definitions is included in Section VIII of this fact sheet.

### I. BASIC INFORMATION

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**COMMON NAME:** oryzalin

**CHEMICAL NAME:** 3,5-dinitro-N4,N4-dipropylsulfanilamide

CAS No. 019044-88-3

**CHEMICAL TYPE:** 2,6-dinitroaniline

**PESTICIDE CLASSIFICATION:** herbicide

**REGISTERED USE STATUS:** "General Use."

**FORMULATIONS:** Commercial herbicide products generally contain one or more ingredients. An inert ingredient is anything added to the product other than an active ingredient. Because of concern for human health and the environment, EPA announced its policy on toxic inert ingredients in the Federal Register on April 22, 1987 (52FR13305). This policy focuses on the regulation of inert ingredients. EPA's strategy for implementing this policy included the development of four lists of inerts, based on toxicological concerns. Inerts of toxicological concern were placed on List 1. Potentially toxic inerts/high priority for testing were placed on List 2. Inerts of unknown toxicity were placed on List 3, and inerts of minimal concern were placed on List 4.

The inert ingredients of the oryzalin formulations are not classified by the USEPA as inert ingredients of toxicological concerns to humans or the environment.

The contents of the oryzalin formulation is listed below:

Surflan Herbicide (both formulations)

Oryzalin	40.4%
Inert	59.6%

**RESIDUE ANALYTICAL METHODS:** Pesticide Analytical Method Volume I FDA Multiresidue Protocols D and E.

## II. HERBICIDE USES

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**REGISTERED FORESTRY, RANGELAND AND RIGHT-OF-WAY USES:** Oryzalin is registered for commercial and non-commercial application to established lawns, ornamental/shade trees, nonagricultural rights-of-way, power stations, and industrial and paved areas.

### OPERATIONAL DETAILS:

**TARGET PLANTS:** Oryzalin is a non-selective, post-emergent herbicide for control of annual grasses, broadleaf weeds, herbaceous plants, woody shrubs and vines.

**MODE OF ACTION:** Oryzalin inhibits cell division.

**METHOD OF APPLICATION:** Oryzalin is applied at an application rate of 0.75 to 6.0 pounds per acre depending on use, formulation and application method.

### SPECIAL PRECAUTIONS:

**TIMING OF APPLICATION:** Oryzalin is a post-emergence herbicide and is applied anytime after emergence of target plants.

**DRIFT CONTROL:** Care should be exercised not to overspray or apply the herbicide to adjacent non-target areas. Drift control is achieved by observing weather conditions and following label and sprayer instructions. Aerial application is not allowed (see below).

**RESTRICTIONS/WARNINGS:** Oryzalin is NOT registered for use on residential lawns. Aerial application is RESTRICTED throughout the U.S., except for agricultural use in California. This herbicide is TOXIC to fish. DO NOT graze or feed forage to livestock in treated areas.

## III. ENVIRONMENTAL EFFECTS/FATE

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### SOIL:

**RESIDUAL SOIL ACTIVITY:** The half-life of oryzalin is 20 days.

**ADSORPTION:** The K(oc) of oryzalin is 75.

**PERSISTENCE AND AGENTS OF DEGRADATION:** Degradates of oryzalin have not been monitored.

**METABOLITES/DEGRADATION PRODUCTS AND POTENTIAL ENVIRONMENTAL EFFECTS:** The manufacturer has not conducted environmental toxicity studies with the degradates of this product.

### WATER:

**SOLUBILITY:** 2.5 mg/kg at 25 C.

**POTENTIAL FOR LEACHING INTO SURFACE AND GROUND WATER:** The product has low potential to leach into surface and ground water.

### AIR:

**VOLATILIZATION:** Oryzalin is not volatile.

**POTENTIAL FOR BYPRODUCTS FROM BURNING OF TREATED VEGETATION:** Nitrogen oxides and other toxic gasses may be formed.

## **IV. ECOLOGICAL TOXICITY EFFECTS ON NON-TARGET SPECIES**

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### **MICROORGANISMS:**

**ACUTE CONTACT TOXICITY:** LD<sub>50</sub> (honey bee 48-hour) >11 µg/bee

**OVERALL TOXICITY: Practically Non-Toxic**

**PLANTS:** Contact will injure or kill target and non-target plants.

### **AQUATIC VERTEBRATES:**

**ACUTE TOXICITY:** LC<sub>50</sub> (rainbow trout 96-hour) 3.26 mg/l

**ACUTE TOXICITY:** LC<sub>50</sub> (bluegill sunfish 96-hour) 2.88 mg/l

**OVERALL TOXICITY: Moderately Toxic**

### **AQUATIC INVERTEBRATES:**

**ACUTE TOXICITY:** LC<sub>50</sub> (*Daphnia Magna* 48-hour) 1.4 mg/l

**OVERALL TOXICITY: Moderately Toxic**

**AQUATIC ESTUARINE/MARINE INVERTEBRATES:** Studies not required by EPA. EPA calculates toxicity will be similar to freshwater invertebrates.

### **TERRESTRIAL ANIMALS:**

**AVIAN ACUTE ORAL TOXICITY:** LD<sub>50</sub> (bobwhite quail) 506.7 mg/kg

**AVIAN DIETARY TOXICITY:** LC<sub>50</sub> (mallard duck) >5000 mg/kg

**SMALL MAMMAL ACUTE ORAL TOXICITY:** LD<sub>50</sub> >10,000 mg/kg

**OVERALL TOXICITY: Slightly to Practically Non-Toxic**

**BIOACCUMULATION POTENTIAL: LOW POTENTIAL**

**THREATENED AND ENDANGERED SPECIES:** Federally listed aquatic organisms may be at risk in shallow water adjacent to treated areas. In addition, oryzalin may adversely affect federally listed plants.

## **V. TOXICOLOGICAL DATA**

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### **ACUTE TOXICITY:**

**ACUTE ORAL TOXICITY:** LD<sub>50</sub> (rat) >10,000 mg/kg

**ACUTE DERMAL TOXICITY:** LD<sub>50</sub> (rabbit) >2000 mg/kg

**PRIMARY SKIN IRRITATION:** No information available

**PRIMARY EYE IRRITATION:** Rabbit – Slightly Irritating

**ACUTE INHALATION:** LC<sub>50</sub> (rat 4-hour) >3.17 mg/l.

**OVERALL TOXICITY: Category III – Caution – Slightly Toxic**

**CHRONIC TOXICITY:**

**CARCINOGENICITY:** Classified by EPA as a Group C possible human carcinogen based on mammary gland tumors.

**DEVELOPMENTAL:** Reduced maternal and fetal body weight and increased runts and bone development effects at high dose levels.

**REPRODUCTIVE:** Increase in liver and kidney weights and decreased food consumption and body weight gain at high dose levels.

**MUTAGENICITY:** No adverse effects.

**HAZARD:** Sufficient cancer risk is present to require PPE in all application methods, and extended reentry intervals.

## **VI. HUMAN HEALTH EFFECTS**

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**ACUTE TOXICITY (POISONING):**

**REPORTED EFFECTS:** None reported.

**CHRONIC TOXICITY:**

**REPORTED EFFECTS:** None reported.

**POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM CONTACTING OR CONSUMING TREATED VEGETATION, WATER OR ANIMALS:** None reported.

**POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM INERT INGREDIENTS CONTAINED IN THE FORMULATED PRODUCTS:** Repeated excessive ingestion of propylene glycol may cause central nervous system effects.

**HEALTH EFFECTS OF EXPOSURE TO FORMULATED PRODUCTS:** Temporary eye irritation. Prolonged or repeated exposure may cause allergic skin reactions.

**HEALTH EFFECTS ASSOCIATED WITH CONTAMINANTS:** None reported.

**HEALTH EFFECTS ASSOCIATED WITH OTHER FORMULATIONS:** None reported.

**HEALTH RISK MANAGEMENT PROCEDURES:** See Section VII.

## VII. SAFETY PRECAUTIONS

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### **SIGNAL WORD AND DEFINITION:**

ORYZALIN - **CAUTION** – AVOID CONTACT WITH EYES SKIN AND CLOTHING. HARMFUL IF SWALLOWED, INHALE, OR ABSORBED THROUGH THE SKIN

**PROTECTIVE PRECAUTIONS FOR WORKERS:** Wear eye protection. Wear long-sleeved shirt, long pants, shoes and socks, and waterproof gloves.

### **MEDICAL TREATMENT PROCEDURES (ANTIDOTES):**

**EYES:** Flush eyes with water; call physician.

**SKIN:** Wash all exposed areas with soap and water. Wash all contaminated clothing prior to reuse. Call a physician if irritation develops.

**INGESTION:** Do not induce vomiting. Call a physician or Poison Control Center. If available, administer activated charcoal (6-8 heaping teaspoonfuls) with a large quantity of water. Do not give by mouth to an unconscious person. Immediately transport to a medical care facility.

**INHALATION:** Remove individual to fresh air. If breathing difficulty occurs, provide CPR assistance and seek immediate medical attention.

**HANDLING, STORAGE AND DISPOSAL:** Keep dry (below 120° F) and store away from food, feed, or other material to be used or consumed by humans or animals. Do not contaminate water. Dispose of only in accordance with local, state and federal regulations.

**EMERGENCY SPILL PROCEDURES AND HAZARDS:** Contain and sweep up material of small spills and dispose as waste. Large spills should be reported to CHEMTREC (800-424-9300) for assistance. Prevent runoff. Do not contaminate water, food, or feed by storage or disposal.

## VIII. DEFINITIONS

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**adsorption** – the process of attaching to a surface

**avian** – of, or related to, birds

**CAEPA** – California Environmental Protection Agency

**carcinogenicity** – ability to cause cancer

**CHEMTREC** – Chemical Transportation Emergency Center

**dermal** – of, or related to, the skin

**EC<sub>50</sub>** - median effective concentration during a bioassay

**ecotoxicological** – related to the effects of environmental toxicants on populations of organisms originating, being produced, growing or living naturally in a particular region or environment

**FIFRA** – Federal Insecticide, Fungicide and Rodenticide Act

**formulation** – the form in which the pesticide is supplied by the manufacturer for use

**half-life** – the time required for half the amount of a substance to be reduced by natural processes

**herbicide** – a substance used to destroy plants or to slow down their growth

**Hg** – chemical symbol for mercury

**IARC** – International Agency for Research on Cancer

**K(oc)** – the tendency of a chemical to be adsorbed by soil, expressed as:  $K(oc) = \text{conc. adsorbed}/\text{conc. dissolved}/\%$  organic carbon in soil

**LC<sub>50</sub>** – the concentration in air, water, or food that will kill approximately 50% of the subjects

**LD<sub>50</sub>** – the dose that will kill approximately 50% of the subjects

**leach** – to dissolve out by the action of water

**mg/kg** – weight ratio expressed as milligrams per kilogram

**mg/l** – weight-to-liquid ratio expressed as milligrams per liter

**microorganisms** – living things too small to be seen without a microscope

**mPa** – milli-Pascal (unit of pressure)

**mutagenicity** – ability to cause genetic changes

**NFPA** – National Fire Protection Association

**NIOSH** - National Institute for Occupational Safety and Health

**NOEL** - no observable effect level

**non-target** – animals or plants other than the ones that the pesticide is intended to kill or control

**OSHA** - Occupational Safety and Health Administration

**Pa – Pascal (unit of pressure)**

**persistence** – tendency of a pesticide to remain to remain in the environment after it is applied

**pesticides** – substances including herbicides, insecticides, rodenticides, fumigants, repellents, growth regulators, etc., regulated under FIFRA

**PPE** – personal protective equipment

**ppm** – weight ratio expressed as parts per million

**residual activity** – the remaining amount of activity as a pesticide

**T&E** – Threatened and Endangered Species (from the Endangered Species Act)

**µg** – micrograms

**volatility** – the tendency to become a vapor at standard temperatures and pressures

## **IX. INFORMATION SOURCES**

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Dow AgroSciences, Surflan® A.S. Herbicide, Material Safety Data Sheet, MSDS: 003738, January 1, 1998

Dow AgroSciences, Surflan® A.S. Specialty Herbicide, Specimen Product Label, Label Code: D02-083-012, February 22, 1999

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EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Oryzalin, June 1996  
<http://ace.orst.edu/info/extoxnet/pips/ghindex.html>

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<http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm>

Spray Drift Task Force, A Summary of Ground Application Studies, 1997  
<http://www.agdrift.com/publications/Body.htm>

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Oryzalin, EPA-738-R-94-016, September 1994 <http://www.epa.gov/oppsrrd1/REDs/>

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<http://www.epa.gov/oppsrrd1/REDs/>

## X. TOXICITY CATEGORY TABLES

TABLE I: HUMAN HAZARDS

Category	Signal Word	Route of Administration			Hazard	
		Acute Oral LD <sub>50</sub> (mg/kg)	Acute Dermal LD <sub>50</sub> (mg/kg)	Acute Inhalation LC <sub>50</sub> (mg/l)	Eye irritation	Skin irritation
I (Highly Toxic)	<b>DANGER</b> (poison)	0-50	0-200	0-0.2	corrosive: corneal opacity not reversible within 7 days	corrosive
II (Moderately Toxic)	<b>WARNING</b>	>50-500	>200-2000	>0.2-2	corneal opacity reversible within 7 days; irritation persisting for 7 days	severe irritation at 72 hours
III (Slightly Toxic)	<b>CAUTION</b>	>500-5000	>2000-20.000	>2-20	no corneal opacity; irritation reversible within 7 days	moderate irritation at 72 hours
IV (Practically Non-toxic)	<b>NONE</b>	>5000	>20,000	>20	no irritation	moderate irritation at 72 hours

After *Pesticide User's Guide*, Ohio State University, Extension Bull. No. 745, 1998.

**TABLE II: ECOTOXICOLOGICAL RISKS TO WILDLIFE (TERRESTRIAL AND AQUATIC)**

<b>Risk Category</b>	<b>Mammals (Acute Oral LD<sub>50</sub> mg/kg)</b>	<b>Avian (Acute Oral LD<sub>50</sub> mg/kg)</b>	<b>Avian LC<sub>50</sub> (mg/kg)</b>	<b>Fish or Aquatic Invertebrates LC<sub>50</sub> (mg/l)</b>
<b>Very Highly Toxic</b>	<10	<10	<50	<0.1
<b>Highly Toxic</b>	10-50	10-50	50-500	0.1 – 1
<b>Moderately Toxic</b>	51-500	51-500	501-1,000	>1 – 10
<b>Slightly Toxic</b>	501-2,000	501-2,000	1,001-5,000	>10 – 100
<b>Practically Non-toxic</b>	>2,000	>2,000	>5,000	>100

Table II created from information contained in *Pesticides and Wildlife*, Whitford, Fred, et al., Purdue University Cooperative Extension Service PPP-30, 1998.

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