Chlorsulfuron

HERBICIDE FACT SHEET

U.S. DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION

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

COMMON NAME: chlorsulfuron

CHEMICAL NAME: 2-Chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)aminocarbonyl] benzenesulfonamide

Cas No. 64902-72-3

CHEMICAL TYPE: sulfonylurea herbicide

PESTICIDE CLASSIFICATION: systemic, selective pre- and post-emergent herbicide

REGISTERED USE STATUS: "General Use Pesticide."

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

The contents of the chlorsulfuron formulation are listed below:

Telar® DF

Chlorsulfuron	75 %
Inert	25 %

RESIDUE ANALYTICAL METHODS: EPA METHOD 632

II. HERBICIDE USES

REGISTERED FORESTRY, RANGELAND AND RIGHT-OF-WAY USES: Chlorsulfuron as Telar® is registered for use in non-agricultural areas for the control of weeds, grasses, and as a total vegetation management tool for bareground treatment. For terrestrial use only.

OPERATIONAL DETAILS:

TARGET PLANTS: Chlorsulfuron is a selective herbicide for pre- and post-emergent control of annual, biennial, and perennial broadleaf weeds.

MODE OF ACTION: Chlorsulfuron enters the plant through the root zone and foliage inhibiting the synthesis of key amino acids.

METHOD OF APPLICATION AND RATES: Broadcast and spot spray applications a t1/4 to 3 ounces of formulated product per acre. Ground application only.

SPECIAL PRECAUTIONS:

TIMING OF APPLICATION: Weeds are controlled by applying Chlorsulfuron prior to or after emergence. As chlorsulfuron must move to the root zone to be effective for pre-emergent control, adequate soil moisture is necessary.

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. Spray droplet size should be 150 microns or larger.

Restrictions/Warnings/Limitations Do not enter or allow others to enter the treated area until sprays have dried. Do not apply through any type of irrigation system. Do not apply directly to water or areas where surface water is present, or to intertidal areas below the mean high water mark. Do not apply to irrigation banks or other ditch banks. Do not use on lawns. Do not use on walks, driveways, tennis courts, or other impermeable areas. Do not apply to frozen ground. Treated soil should remain undisturbed. Will harm non-target plants.

III. ENVIRONMENTAL EFFECTS/FATE

SOIL:

RESIDUAL SOIL ACTIVITY: The half-life of chlorsulfuron is 28 to 42 days.

ADSORPTION: The K(oc) of chlorsulfuron is 33.

PERSISTENCE AND AGENTS OF DEGRADATION: Chlorsulfuron is persistent with no major (>10%) degradates.

METABOLITES/DEGRADATION PRODUCTS AND POTENTIAL ENVIRONMENTAL EFFECTS: Chlorsulfuron degrades to nonphytotoxic, low-molecular-weight compounds.

WATER:

SOLUBILITY: 31,800 mg/l in water (pH 7).

POTENTIAL FOR LEACHING INTO SURFACE AND GROUND WATER: Chlorsulfuron is moderately persistent and highly mobile and has potential to enter surface waters from runoff. The very low application rate and microbial breakdown suggest that chlorsulfuron has little potential to enter ground water.

AIR:

VOLATILIZATION: Nonvolatile.

POTENTIAL FOR BYPRODUCTS FROM BURNING OF TREATED VEGETATION: Not known.

IV. ECOLOGICAL TOXICITY EFFECTS ON NON-TARGET SPECIES

MICROORGANISMS:

ACUTE CONTACT TOXICITY: LD_{50} (honey bee contact) >25 µg/bee

OVERALL TOXICITY: Practically Non-Toxic

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

AQUATIC VERTEBRATES:

ACUTE TOXICITY: LC_{50} (rainbow trout 96-hour) >250 mg/l

ACUTE TOXICITY: LC_{50} (bluegill sunfish 96-hour) >300 mg/l

OVERALL TOXICITY: Practically Non-Toxic

AQUATIC FRESHWATER INVERTEBRATES:

ACUTE TOXICITY: LC_{50} (*Daphnia magna* 48-hour) 370.9 mg/l

OVERALL TOXICITY: Practically Non-Toxic

AQUATIC ESTUARINE/MARINE INVERTEBRATES:

ACUTE TOXICITY: EC_{50} (Eastern oyster larvae 48-hour) 385 mg/l

ACUTE TOXICITY: LC_{50} (sheepshead minnow 96-hour) >980

OVERALL TOXICITY: Practically Non-Toxic

TERRESTRIAL ANIMALS:

AVIAN ACUTE ORAL TOXICITY: LD_{50} (bobwhite quail) >5000 mg/kg

AVIAN ACUTE ORAL TOXICITY: LD_{50} (mallard duck) >5000 mg/kg

AVIAN SUBACUTE DIETARY TOXICITY: LC_{50} (bobwhite quail) >5620 mg/kg

AVIAN SUBACUTE DIETARY TOXICITY: LC_{50} (mallard duck) >5000 mg/kg

MAMMAL ACUTE ORAL TOXICITY: LD_{50} (rat) >5000 mg/kg

OVERALL TOXICITY: Practically Non-Toxic

BIOACCUMULATION POTENTIAL: No Potential

THREATENED AND ENDANGERED SPECIES: Federally listed plants may be adversely affected if the product is applied directly to the plants.

V. TOXICOLOGICAL DATA

ACUTE TOXICITY:

ACUTE ORAL TOXICITY: LD_{50} (rat) >5000 mg/kg

ACUTE DERMAL TOXICITY: LD_{50} (rabbit) >2000 mg/kg

PRIMARY SKIN IRRITATION: Rabbit - Not an Irritant

PRIMARY EYE IRRITATION: Rabbit – Moderate Irritant

ACUTE INHALATION: LC_{50} (rat) >5.9 mg/l

OVERALL TOXICITY: Category III – Caution

CHRONIC TOXICITY:

CARCINOGENICITY: No effects reported.

DEVELOPMENTAL/REPRODUCTIVE: No effects reported.

MUTAGENICITY: Not a mutagenic.

HAZARD: The end-use product label for Telar® carries the *Caution* signal word due to eye, nose, throat or skin irritation.

VI. HUMAN HEALTH EFFECTS

ACUTE TOXICITY (POISONING):

REPORTED EFFECTS: None.

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: None reported.

HEALTH EFFECTS OF EXPOSURE TO FORMULATED PRODUCTS: Mild, temporary skin and eye irritation.

HEALTH EFFECTS ASSOCIATED WITH CONTAMINANTS: None reported.

HEALTH EFFECTS ASSOCIATED WITH OTHER FORMULATIONS: None reported.

VII. SAFETY PRECAUTIONS

SIGNAL WORD AND DEFINITION:

CHLORSULFURON **- CAUTION** – MAY IRRITATE EYES, NOSE, THROAT OR SKIN

PROTECTIVE PRECAUTIONS FOR WORKERS: Applicators and other handlers must wear long-sleeved shirt and long pants, shoes plus socks.

MEDICAL TREATMENT PROCEDURES (ANTIDOTES):

EYES: Flush eyes with water; call physician if irritation persists.

SKIN: Wash all exposed areas with soap and water; call physician if irritation persists.

INGESTION: Induce vomiting and call physician or Poison Control Center.

INHALATION: Remove to fresh air.

HANDLING, STORAGE AND DISPOSAL: Store at room temperature or cooler. Do not reuse container. Rinse container and dispose accordingly.

EMERGENCY SPILL PROCEDURES AND HAZARDS: Contain and sweep up material of small spills and dispose as waste. Do not contaminate water, food, or feed by storage or disposal.

VIII. DEFINITIONS

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_{50} - 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) = conc. adsorbed/conc. dissolved/% organic carbon in soil

LC_{50} – the concentration in air, water, or food that will kill approximately 50% of the subjects

LD_{50} – 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

Du Pont Agricultural Products, Escort®, Oust®, Telar® Herbicides, Product Information Bulletin, H-66607, June 1996

Du Pont Agricultural Products, Noxious/Selective Weed Control, Escort® and Telar® Herbicides, Product Information Bulletin, H-87254, January 2000

Du Pont Agricultural Products, Glean® Herbicide, Specimen Product Label, H-63102, August 22, 1996

Du Pont Agricultural Products, Glean® Herbicide, Material Safety Data Sheet M0000088, March 5, 1998

Du Pont Agricultural Products, Telar® DF Herbicide, Specimen Product Label, H-62770, August 22, 1996

Du Pont Agricultural Products, Telar® DF Herbicide, Material Safety Data Sheet M0000026, April 17, 1998

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

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, 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

USDA Forest Service, Pesticide Fact Sheet, Chlorsulfuron, November 1995 http://www.infoventures.com/e-hlth/pestcide/pest-fac.html

X. TOXICITY CATEGORY TABLES

TABLE I: HUMAN HAZARDS

Category	Signal Word	Route of Administration			Hazard	
		Acute Oral LD_{50} (mg/kg)	Acute Dermal LD_{50} (mg/kg)	Acute Inhalation LC_{50} (mg/l)	Eye irritation	Skin irritation
I (Highly Toxic)	**DANGER (poison)**	0–50	0-200	0-0.2	corrosive: corneal opacity not reversible within 7 days	corrosive
II (Moderately Toxic)	**WARNING**	>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)	**CAUTION**	>500-5000	>2000-20.000	>2-20	no corneal opacity; irritation reversible within 7 days	moderate irritation at 72 hours
IV (Practically Non-toxic)	**NONE**	>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)

Risk Category	Mammals Acute Oral LD_{50} mg/kg)	Avian Acute Oral LD_{50} (mg/kg)	Avian Acute Dietary LC_{50} (mg/kg)	Fish or Aquatic Invertebrates Acute Concentration LC_{50} (mg/l)
Very Highly Toxic	<10	<10	<50	<0.1
Highly Toxic	10-50	10-50	50-500	0.1 – 1
Moderately Toxic	51-500	51-500	501-1,000	>1 – 10
Slightly Toxic	501-2,000	501-2,000	1,001-5,000	>10 – 100
Practically Non-toxic	>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.

Disclaimers and Other Legal Information:

Mention of a trademark, vendor, technique, or proprietary product does not imply or constitute an endorsement of the product by the United States Department of Energy - Bonneville Power Administration (USDOE-BPA), its employees, and its contractors, and does not imply or endorse any product to the exclusion of others. In all cases, the user is required by law to follow all pesticide label instructions and restrictions.

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