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# Clopyralid

## 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:** clopyralid

**CHEMICAL NAME:** 3,6-dichloro-2-pyridinecarboxylic acid, monoethanolamine salt

Cas No. 1702-17-6

**CHEMICAL TYPE:** pyridine-carboxylic acid

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

The contents of the clopyralid formulation are listed below:

Transline® Specialty Herbicide

Clopyralid	40.9 %
Inert	59.1 %

**RESIDUE ANALYTICAL METHODS:** Gas/liquid chromatography.

## II. HERBICIDE USES

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**REGISTERED FORESTRY, RANGELAND AND RIGHT-OF-WAY USES:** Clopyralid is registered for use in crop and non-crop sites for selective post-emergent weed control. For terrestrial use only.

### OPERATIONAL DETAILS:

**TARGET PLANTS:** Selective, broad leaf weeds.

**MODE OF ACTION:** Clopyralid is an auxin growth regulator absorbed by the leaves.

**METHOD OF APPLICATION AND RATES:** Aerial (helicopter only) and ground broadcast, spot and localized applications. One-third to 1 1/3 pints per acre.

### SPECIAL PRECAUTIONS:

**TIMING OF APPLICATION:** Timing is dependent on emergence of the target plant. As clopyralid must be absorbed through the leaves, timing is limited to emerged 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. Spray droplet size should be 150 microns or larger.

**Restrictions/Warnings/Limitations:** Groundwater advisory. Do not contaminate irrigation ditches or water used for irrigation or domestic purposes. T&E warning for plants.

## III. ENVIRONMENTAL EFFECTS/FATE

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### SOIL:

**RESIDUAL SOIL ACTIVITY:** The half-life of clopyralid is 40 days.

**ADSORPTION:** The K(oc) of clopyralid is 6.

**PERSISTENCE AND AGENTS OF DEGRADATION:** Clopyralid is moderately persistent in the plant and soils. The primary route of degradation is microbial activity.

**METABOLITES/DEGRADATION PRODUCTS AND POTENTIAL ENVIRONMENTAL EFFECTS:** Clopyralid degrades to carbon dioxide and other unidentified products.

### WATER:

**SOLUBILITY:** 300,000 mg/l in water (pH 7 at 25° C).

**POTENTIAL FOR LEACHING INTO SURFACE AND GROUND WATER:** Clopyralid is moderately persistent with a very low soil adsorption coefficient. There is a high potential for clopyralid to leach into groundwater when applied over shallow aquifers or to soils having high permeability.

**AIR:**

**VOLATILIZATION:** Not volatile.

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

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

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**MICROORGANISMS:**

**ACUTE CONTACT TOXICITY:** LD<sub>50</sub> (honey bee contact) >100 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) >100 mg/l

**ACUTE TOXICITY:** LC<sub>50</sub> (bluegill sunfish 96-hour) >100 mg/l

**OVERALL TOXICITY: Practically Non-Toxic**

**AQUATIC FRESHWATER INVERTEBRATES:**

**ACUTE TOXICITY:** LC<sub>50</sub> (*Daphnia magna* 48-hour) >100 mg/l

**OVERALL TOXICITY: Practically Non-Toxic**

**AQUATIC ESTUARINE/MARINE INVERTEBRATES:**

**ACUTE TOXICITY:** LC<sub>50</sub> (fiddler crab 96-hour) No information

**ACUTE TOXICITY:** LC<sub>50</sub> (grass shrimp 96-hour) No information

**OVERALL TOXICITY: Practically Non-Toxic**

**TERRESTRIAL ANIMALS:**

**AVIAN ACUTE ORAL TOXICITY:** LD<sub>50</sub> (bobwhite quail) <2000 mg/kg

**AVIAN ACUTE ORAL TOXICITY:** LD<sub>50</sub> (mallard duck) <2000 mg/kg

**AVIAN SUBACUTE DIETARY TOXICITY:** LC<sub>50</sub> (bobwhite quail) <5000 mg/kg

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

**MAMMAL ACUTE ORAL TOXICITY:** LD<sub>50</sub> (rat) >4000 mg/kg

**OVERALL TOXICITY: Slightly Toxic**

**BIOACCUMULATION POTENTIAL: Little or No Potential**

**THREATENED AND ENDANGERED SPECIES:** Federally listed terrestrial and aquatic plants may be adversely affected if the product is applied directly to the plants, or indirectly as the result of drift or leaching.

## V. TOXICOLOGICAL DATA

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### ACUTE TOXICITY:

**ACUTE ORAL TOXICITY:** LD<sub>50</sub> (rat) >5000 mg/kg

**ACUTE DERMAL TOXICITY:** LD<sub>50</sub> (rabbit) >5000 mg/kg

**PRIMARY SKIN IRRITATION:** Rabbit - Moderate Irritant

**PRIMARY EYE IRRITATION:** Rabbit – Slight Irritant

**ACUTE INHALATION:** LC<sub>50</sub> (rat) >3.0 mg/l

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

### CHRONIC TOXICITY:

**CARCINOGENICITY:** No evidence of carcinogenicity in test animals.

**DEVELOPMENTAL/REPRODUCTIVE:** Some effects at highest dose levels.

**MUTAGENICITY:** No effects.

**HAZARD:** The end-use product labels for clopyralid formulations carry the *Caution* signal word due to potential eye, skin and inhalation hazards.

## 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:** EPA reports no toxicological endpoints of concern..

**POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM INERT INGREDIENTS CONTAINED IN THE FORMULATED PRODUCTS:** None reported.

**HEALTH EFFECTS OF EXPOSURE TO FORMULATED PRODUCTS:** None reported.

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

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

## VII. SAFETY PRECAUTIONS

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### SIGNAL WORD AND DEFINITION:

CLOPYRALID - **CAUTION** – CAUSES EYE INJURY. HARMFUL IF INHALED OR ABSORBED THROUGH THE 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.

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

**INGESTION:** Rinse mouth thoroughly with water. Do not induce vomiting. Call physician.

**INHALATION:** Remove to fresh air. Call a physician if breathing difficulty persists.

**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

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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:  $K(oc) = \text{conc. adsorbed}/\text{conc. dissolved}/\% \text{ organic carbon in soil}$

**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, Transline® Specialty Herbicide, Specimen Product Label, D02-113-012, July 26, 1999

Dow AgroSciences, Glypro® Specialty Herbicide, Material Safety Data Sheet, 002805, June 4, 1999

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, Clopyralid, November 1995  
<http://www.fs.fed.us/foresthealth/pesticide/index.html>

## 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 (poison)</b>	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)

Risk Category	Mammals	Avian	Avian	Fish or Aquatic Invertebrates
	Acute Oral LD <sub>50</sub> (mg/kg)	Acute Oral LD <sub>50</sub> (mg/kg)	Acute Dietary LC <sub>50</sub> (mg/kg)	Acute Concentration LC <sub>50</sub> (mg/l)
<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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