Sources of Exposure

General Populations
- Exposure to 1,3-DCP may occur by inhalation of contaminated air, ingestion of contaminated water, or by touching contaminated soil. These levels may be higher near hazardous waste sites.
- 1,1-, 1,2-, 2,3-, and 3,3-DCP are not commonly detected in air, surface water, ground water, drinking water, soil, or food.
- People who live near facilities that produce or use 2,3-DCP may be exposed to higher levels of this chemical.

Occupational Populations
- Workers involved in the production or use of 1,3-DCP as a pesticide.
- Workers involved in the manufacture or use of 2,3-DCP to make other chemicals.
- Workers involved in the manufacture of 1,1-, 1,2-, or 3,3-DCP, although only very small amounts of these chemicals are produced.

Toxicokinetics and Normal Human Levels

**Toxicokinetics**
- 1,3-DCP vapors are readily absorbed through the lungs in humans. Over 70% absorption was estimated in volunteers.
- 1,3-DCP vapor is absorbed through the skin. Dermal absorption may account for 2–5% of absorption from inhalation.
- There are no data about oral absorption on any isomer.
- There are no data on tissue distribution of DCP isomers in humans.
- In humans, 1,3- and 2,3-DCP are conjugated with glutathione and excreted in urine as N-acetyl cysteine conjugates.
- Depletion of glutathione may result in formation of toxic metabolites.
- There are no in vivo data on the metabolism or elimination of 1,1-, 1,2, or 3,3-DCP in humans or animals.
- DCPs do not accumulate in the body.

**Normal Human Levels**
- No data were located.

Biomarkers/Environmental Levels

**Biomarkers**
- The N-acetyl cysteine conjugate of 1,3-DCP in urine correlated well with exposure levels in workers.
- For single exposures, urinary testing must be conducted within 2 days of exposure because the metabolite is eliminated quickly.

**Environmental Levels**
- 1,1-, 1,2-, 2,3-, and 3,3-DCP are not commonly found at measurable concentrations in air, water, or soil samples.
  - **Air**
    - 1,3-DCP was detected in <5% of urban air samples. The mean concentration in urban and rural air samples was 0.088–0.33 ppb.
  - **Sediment and Soil**
    - 1,3-DCP is not commonly found at measurable quantities in soil or sediment samples.
  - **Water**
    - 1,3-DCP levels in 1999-2006 U.S. monitoring data ranged between 0.002—25 ppb (mean= 0.5 ppb).

Reference
Dichloropropenes are Liquids
- DCPs are synthetic chemicals.
- There are five DCP isomers based on the position of the chlorine atoms in the three-carbon chain: 1,1-DCP, 1,2-DCP, 1,3-DCP, 2,3-DCP, and 3,3-DCP.
- 1,3-DCP is a colorless liquid with a sweet smell. It dissolves in water and evaporates easily.
- 1,2- and 2,3-DCP dissolve in water and all isomers dissolve in organic solvents.
- 1,3-DCP is used mainly in farming as soil fumigant for parasitic nematodes.
- 2,3-DCP is used as a chemical intermediate.
- No uses were found for 1,1-, 1,2-, or 3,3-DCP.

Inhalation – Predominant route of exposure to 1,3-DCP for the general population. Also, important route of exposure for workers who manufacture 1,3-DCP or 2,3-DCP, or use 1,3-DCP as a soil fumigant for farming.

Oral – Potential route of exposure at or near waste sites via ingestion of contaminated media.

Dermal – Skin contact may occur during manufacture or use of these substances or by touching contaminated media near waste sites.

Dichloropropenes in the Environment
- 1,3-DCP in soil and water may undergo hydrolysis and be broken down by microorganisms.
- 1,3-DCP that volatilizes to the atmosphere is degraded by photooxidation or by reaction with ozone.
- The half-life of 1,3-DCP in air ranges between 7 and 50 hours.
- Some 1,3-DCP in air may be washed down onto the ground, lakes, or streams by rain.
- Some 1,3-DCP in soil may travel through the soil and reach groundwater.
- Other DCP isomers are expected to behave similarly to 1,3-DCP in the environment, but specific data are not available.

Minimal Risk Levels (MRLs)

**Inhalation**
- No acute-duration inhalation MRL was derived for 1,3-DCP.
- An MRL of 0.008 ppm has been derived for intermediate-duration inhalation exposure (15–364 days) to 1,3-DCP.
- An MRL of 0.007 ppm has been derived for chronic-duration inhalation exposure (≥1 year) to 1,3-DCP.
- An MRL of 0.002 ppm has been derived for acute-duration inhalation exposure (≤14 days) to 2,3-DCP.
- No intermediate- or chronic-duration inhalation MRLs were derived for 1,1- or 3,3-DCP.
- No oral MRLs were derived for 1,1-, 1,2-, 2,3-, or 3,3-DCP for any exposure.

**Oral**
- No acute-duration oral MRL was derived for 1,3-DCP.
- An MRL of 0.04 mg/kg/day has been derived for intermediate-duration oral exposure (≤15-364 days) to 1,3-DCP.
- An MRL of 0.03 mg/kg/day has been derived for chronic-duration oral exposure (≥1 year) to 1,3-DCP.
- No oral MRLs were derived for 1,1-, 1,2-, 2,3-, or 3,3-DCP for any exposure.

Health Effects
- High concentrations of 1,3-DCP in the air cause respiratory effects including mucous membrane irritation, chest pain, and cough.
- Ingestion of high concentrations of 1,3-DCP causes severe stomach damage.
- Skin contact with pesticides containing 1,3-DCP has produced contact dermatitis and blisters in workers, and an allergic reaction on the skin.
- Dogs that ingested 1,3-DCP developed microcytic anemia.
- EPA has classified 1,3-DCP as a probable human carcinogen based on inadequate data in humans and sufficient evidence in animals. Other isomers have not been classified.
- DHHS has determined that 1,3-DCP may reasonably be anticipated to be a human carcinogen.

Children’s Health
- It is not known whether children are more susceptible to DCPs poisoning than adults.
- Children exposed to DCPs would probably experience the same effects as adults.