PENTACHLOROPHENOL

FACT SHEET ON A DRINKING WATER CHEMICAL CONTAMINANT

GENERAL INFORMATION

Synonyms:
- PCP; Penta; Pentachlorohydroxybenzene
- Trade Names: Chlorophen; Dowicide-7; Santophen-20; Pentacon; Penwar, etc.

Chemical Description:
- Synthetic organic chemical produced commercially by the chlorination of phenol or polychlorophenols

Properties:
- Light-brown solid (beads or flakes)
- Slightly water soluble, but its sodium and potassium salts are very soluble in water
- Low vapor pressure
- Heavier than water
- Commercial preparations may contain varying concentrations of highly toxic substances, such as dioxins

Production and Use:
- PCP and its sodium salt are commonly used pesticides in the U.S.
  - used as a wood preservative
  - prior to 1987, when EPA banned all non-wood uses, it was used as a wide-spectrum fungicide and bactericide, and as a preservative in glues, starches, and photographic papers

ENVIRONMENTAL PROFILE

Occurrence:
- Identified at low levels in ground and surface waters and in one survey of surface drinking water supplies

Releases:
- PCP may enter the environment from treated wood, industrial discharges, municipal waste treatment plant discharges, spills, or agricultural runoff

Environmental Fate:
- **Released to soil:** will be persistent in soil; not likely to volatilize or be leached; biodegradation by microbial action is the major route of removal from soils; will adsorb to sediment in acidic soils (low mobility), but will be likely to leach (will be mobile) and may migrate to ground waters in neutral to alkaline soils
- **Released to surface water:** non-persistent in surface water; may volatilize to the atmosphere, where it is subject to washout; photodegradation and biodegradation by microbial action are the primary removal mechanisms, although biodegradation requires acclimated organisms
- High potential for bioaccumulation

HEALTH EFFECTS

Humans:
- Case studies of occupational exposure demonstrate such effects as profuse sweating, often accompanied by fever, weight loss, and gastrointestinal irritation; liver and kidney functions are also impaired, but appear to be reversible once exposure ceases

Experimental Animals:
- Acute exposure to PCP causes adverse central nervous system (CNS) effects which progress from respiratory disorder to coma and death
- Chronic exposure studies indicate adverse effects upon functions of the liver and kidney, and immune system
- Has fetotoxic potential, as seen by delayed ossification of offspring's skeletal system
- Equivocal evidence of mutagenicity
- High carcinogenic potential

REGULATORY PROFILE

Existing Standards:
- **Clean Air Act (CAA):** Regulated
- **Clean Water Act (CWA):**
  Criteria established
- **Resource Conservation and Recovery Act (RCRA):**
  Hazardous waste
- **Superfund (CERCLA):**
  - Hazardous substance
  - **SARA:** Toxic chemical
- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):**
  Registered
- **Toxic Substances Control Act (TSCA):**
  Not regulated

HEALTH INFORMATION

Maximum Contaminant Level Goals (MCLG):

- Non-enforceable levels based solely on an evaluation of possible health risks and exposure, and taking into consideration a margin for public safety
- Set at zero mg/L to protect against cancer

MCLG for Pentachlorophenol = Zero mg/L (effective July 1992)

Maximum Contaminant Levels (MCL):

- Legally enforceable levels for contaminants in public drinking water supplies
- Based on health risks associated with the contaminants, analytical methods for their assay, and water treatment feasibility and practicality aspects
- Exceedance of the MCL in drinking water may result in adverse effects which will depend upon the contaminant concentration in water, amount of water/contaminant ingested, length of exposure, and other biological parameters

MCL for Pentachlorophenol = 0.001 mg/L (effective July 1992)

EPA Health Advisories (HA):

- **Short-term HAs:** Provide acceptable concentrations of contaminants in water for up to 10 day exposures, primarily to evaluate the public health risk resulting from an accidental spill or an emergency contamination situation
- **Longer-term HAs:** Provide guidance for persistent water contamination situations to cover a period of up to 7 years
- **Lifetime HAs:** Derived in the same way as an MCLG

Health Advisories:

Short-term HA for a child = 0.3 mg/L
Longer-term HA for a child = 0.3 mg/L
Longer-term HA for an adult = 1 mg/L

ANALYTICAL METHODS

- Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry
  EPA Method 525
- Gas Chromatography with an Electron Capture Detector
  EPA Method 515.1

WATER TREATMENT

Permanent Treatment:

- **Best Available Technology (BAT):**
  - Granular Activated Carbon

SHORT-TERM HAZARD ELIMINATION

- If the drinking water standards are exceeded, install BAT or use an alternative drinking water supply such as bottled water

ADDITIONAL HELP

- State or county health officials can indicate a certified laboratory for testing
- Experts in the state Department of Environmental Protection, Natural Resources, or Agriculture may also be of help
- The EPA has toll-free numbers for further information on drinking water quality, treatment technologies, for obtaining Health Advisories, and for other regulatory information
- EPA Hotlines are available Monday through Friday
  - **Safe Drinking Water: 800-426-4791**
  - **National Pesticides: 800-858-7378**
  - **Superfund/RCRA: 800-424-9346**
- For information on the Clean Water Act, call (202) 260-7301
- For information on the Toxic Substances Control Act, call (202) 554-1404
- For information on the Clean Air Act, call (919) 541-2777