

Fact Sheet Date: March 12, 1998

**NEW YORK STATE
- HUMAN HEALTH FACT SHEET -**

**Ambient Water Quality Value for
Protection of Sources of Potable Water**

SUBSTANCE: 2,4-Dichlorophenoxyacetic acid (2,4-D)

CAS REGISTRY NUMBER: 94-75-7

AMBIENT WATER QUALITY VALUE: 50 micrograms/liter (50 ug/L)

BASIS: Specific MCL

INTRODUCTION

The physical, chemical and toxicological properties of 2,4-dichlorophenoxyacetic acid (2,4-D) have been reviewed (US EPA, 1985a,b, 1987, 1988, 1989, 1991, 1992). The following ambient water quality values were derived using these and other references and the procedures outlined in 6 NYCRR 702.2 through 702.7.

SPECIFIC MCL AND PRINCIPAL ORGANIC CONTAMINANT CLASS (702.3)

2,4-D has a Specific MCL of 50 ug/L as defined in 6 NYCRR 700.1. This is a maximum contaminant level for drinking water established by the New York State Department of Health under the State Sanitary Code (10 NYCRR Part 5, Public Water Systems). Therefore, a water quality value of 50 ug/L (the Specific MCL) can be derived based on 6 NYCRR 702.3(a). 2,4-D is not in a principal organic contaminant class as defined in 6 NYCRR 700.1.

ONCOGENIC EFFECTS (702.4)

There may be an association between the use of farm herbicides, including phenoxyacetic acids, and an increased risk of non-Hodgkin's lymphoma (Hoar et al., 1986). Studies performed to test the oncogenicity of 2,4-D in laboratory animals have provided equivocal results, and additional studies are ongoing (US EPA, 1992). The available data are inadequate to evaluate the oncogenic potential of 2,4-D (US EPA, 1992).

NON-ONCOGENIC EFFECTS (702.5)

2,4-D damages the blood, kidneys and liver of laboratory animals (US EPA, 1985a,b, 1987). In 1986, the U.S. EPA established an oral reference dose (equivalent to an acceptable daily intake) of 10 micrograms per kilogram body weight per day (ug/kg/day) for 2,4-D (Exhibit 1, taken from US EPA, 1995a), using procedures consistent with those outlined in paragraphs (a) and (b) of 6 NYCRR 702.5. This reference dose was derived by application of a 100-fold uncertainty factor to a no-observed-effect level of 1,000 ug/kg/day for blood, kidney and liver toxicity in rats given food containing 2,4-D for 90 days or one year (US EPA, 1995a). A value of 70 ug/L is derived using the procedure outlined in paragraph (e) of 6 NYCRR 702.5 and allowing 20% of the acceptable daily intake to come from drinking water (6 NYCRR 702.5(c)).

CHEMICAL CORRELATION (702.7)

2,4-Dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) are classified as chlorophenoxy herbicides and have similar chemical structures: the only difference in the structure of the two compounds is a third chlorine substitution in 2,4,5-T (Stevens and Sumner, 1991). The two compounds also have similar non-oncogenic effects (Stevens and Sumner, 1991). The available data were not sufficient to evaluate 2,4-D based on oncogenic effects (6 NYCRR 702.5), moreover, the available data on 2,4,5-T are inadequate to evaluate its oncogenic potential (US EPA, 1995b). Thus, a oncogenic value based on chemical correlation was not derived.

OTHER STANDARDS AND GUIDELINES

Under New York State Department of Health regulations for drinking-water standards (10 NYCRR Part 5), the Specific maximum contaminant level (MCL) for 2,4-D is 50 ug/L. Under the Safe Drinking Water Act, the federal maximum contaminant level goal (MCLG) and the MCL for 2,4-D are both 70 ug/L, assuming a 70-kg adult drinks 2 L/day and allocating 20% of the U.S. EPA reference dose (10 ug/kg/day) to drinking water (US EPA, 1991).

The World Health Organization (WHO) calculated a tolerable daily intake of 10 ug/kg/day for 2,4-D by applying an uncertainty factor of 100 to a no-observed-adverse-effect level of 1,000 ug/kg/day for kidney effects identified in two-year studies in mice and rats (WHO, 1993). An uncertainty factor of 100 was used to account for intra- and interspecies variation. The WHO also derived a guideline value of 30 ug/L for 2,4-D in drinking water, assuming a 60-kg adult drinks 2 L/day and allocating 10% of the WHO tolerable daily intake (10 ug/kg/day) to drinking water (WHO, 1993).

SELECTION OF VALUE

According to 6 NYCRR 702.2(b), the selected ambient water quality value shall be the most stringent of the values derived using the procedures found in 6 NYCRR 702.3 through 702.7. This value is 50 ug/L (based on a Specific MCL under 10 NYCRR Part 5) and is the value selected as the water quality value for 2,4-D.

REFERENCES

Hoar, S.K., A. Blair, F.F. Holmes and others. 1986. Agricultural herbicide use and risk of lymphoma and soft-tissue sarcoma. *JAMA*. 256:1141-1147.

6 NYCRR (New York State Codes, Rules and Regulations). Water Quality Regulations, Surface Water and Groundwater Classifications and Standards: Title 6 NYCRR, Chapter X, Parts 700 - 705. Albany, NY: New York State Department of Environmental Conservation.

10 NYCRR (New York State Codes, Rules and Regulations). Public Water Systems: Title 10 NYCRR, Chapter 1, State Sanitary Code, Subpart 5-1. Albany, NY: New York State Department of Health, Bureau of Public Water Supply Protection.

Stevens, J.T. and D.D. Sumner. 1991. Herbicides. IN: Handbook of Pesticide Toxicology, Volume III. Hayes, Jr., W.J and E.R. Laws, Jr., eds. New York, NY: Academic Press. pp. 1317-1408.

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US EPA (U.S. Environmental Protection Agency). 1995b. 2,4,5-Trichlorophenoxyacetic Acid. On-Line as of May 1. Integrated Risk Information System (IRIS). Cincinnati, OH: Office of Research and Development, Environmental Criteria and Assessment Office.

WHO (World Health Organization). 1993. Guidelines for Drinking-Water Quality, 2nd Edit., Vol. 1: Recommendations. Geneva: World Health Organization.

SEARCH STRATEGY: ON-LINE TOXICOLOGIC DATABASE

Toxline (1981 to May, 1995) was searched linking the CAS Registry Number for 2,4-D with the keyword "toxicity."

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