Ground Water Quality Standard for 2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP)

CASRN# 93-65-2

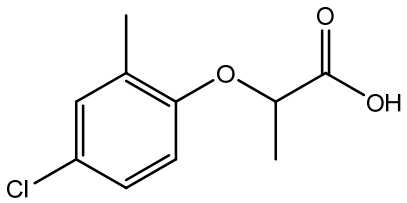
February 2008 NJDEP

Summary of Decision: In accordance with the New Jersey Ground Water Quality Standards rules at N.J.A.C. 7:9C-1.7, the Department of Environmental Protection (Department) has developed an interim specific ground water quality criterion of 7 μg/L and PQL of 0.5 μg/L (ppb) for 2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP). The basis for this criterion and PQL are discussed below. Pursuant to N.J.A.C. 7:9C-1.9(c), **the applicable constituent standard is 7 μg/L**.

2-(2-Methyl-4-chlorophenoxy)propionic acid (MCPP)

Molecular Formula: $C_{10}H_{11}ClO_3$

Molecular Structure:



Background: MCCP has been evaluated by the U.S. Environmental Protection Agency (USEPA), and a Reference Dose and carcinogenicity classification is available on the USEPA IRIS database. The Department has determined that the USEPA IRIS Reference Dose (RfD) and carcinogenicity classification for MCCP are an appropriate basis for the ground water criterion. IRIS does not provide a carcinogenicity assessment for MCPP; therefore, it is treated as a noncarcinogen.

Reference Dose: The IRIS Reference Dose (RfD) for MCCP is 0.001 mg/kg/day, based on a No Observed Effect Level (NOEL) of 3 mg/kg/day. The RfD was developed in 1989 based on a dietary 90-day study in rats (BASF Aktiegesellschaft, 1985). A total uncertainty factor of 3000 was used to account for interspecies variability (10), intraspecies variability (10), the subchronic nature of the study (10), and to account for data deficiencies including the lack of a second species toxicity feeding study (e.g. dog), and a reproductive study (3). Based on the uncertainty factor adjustment (shown below), the RfD for MCCP is 0.001 mg/kg/day.

Uncertainty factor (UF) adjustment:

$UF_{interspecies\ variability}$ = 10
$UF_{intraspecies\ variability}$ = 10
$UF_{subchronic\ study}$ = 10
$UF_{modifying\ factor}$ = 3 (based on observation of increased kidney weight in single sub-chronic rat study)

$UF = UF_{total} = 10 \times 10 \times 10 \times 3 = 3000$

RfD = NOEL/UF = 3 mg/kg/day = .001 mg/kg/day
3000

Derivation of Ground Water Quality Criterion: The ground water quality criterion was derived pursuant to the formula established at N.J.A.C. 7:9C-1.7(c)4, using 0.001 mg/kg/day as the Reference Dose (as explained above), and standard default assumptions:

$$\frac{0.001 \text{ mg/kg/day} \times 70 \text{ kg} \times 0.2}{2 \text{ L/day}} = 0.007 \text{ mg/L or } 7 \text{ } \mu\text{g/L}$$

Where:
0.001 mg/kg/day = Reference Dose (RfD)
70 kg = assumed body weight of average person
0.2 = Relative Source Contribution from drinking water
2 L/day = assumed daily drinking water intake

Derivation of PQL: The method detection limit (MDL) and the practical quantitation level (PQL) are performance measures used to estimate the limits of performance of analytic chemistry methods for measuring contaminants. The MDL is defined as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero" (40 CFR Part 136 Appendix B). USEPA recommends that the MDL be multiplied by a factor of five or 10 to account for the variability and uncertainty that can occur at the MDL. The Department uses a value of five as the median upper boundary of the inter-laboratory MDL distribution from the New Jersey certified laboratory community and multiplies the MDL by five to derive the PQL. Establishing the PQL at a level that is five times the MDL provides a reliable quantitation level that most laboratories can be expected to meet during day-to-day operations.

2-(2-Methyl-4-chlorophenoxy)propanoic acid (MCCP) appears as a listed parameter in a published method – "OSW USEPA 8151A, Chlorinated Herbicides and Related Compounds in Water, Soil, and Waste Samples by Capillary GC-ECD" (see the National Environmental Methods Index (NEMI)). The limit of detection in this method is specified as 0.09 ppb. As explained above, a more conservative detection limit is established using a multiplier of five. 0.09 ppb x 5 = 0.45 ppb, which rounds to 0.5 ppb. Therefore, the Department has established a PQL of 0.5 ppb for MCCP.

Conclusion: Based on the information provided above (and cited below), the Department has established an interim specific ground water quality criterion of 7 µg/L and a PQL of 0.5 µg/L (ppb) for MCCP. Pursuant to N.J.A.C. 7:9C-1.9(c), since the criterion is higher than the PQL for this constituent, **the applicable constituent standard for MCCP is 7 µg/L**.

Technical Support Documents: *Interim Specific Ground Water Quality Criterion Recommendation Report for 2-(2-Methyl-4-chlorophenoxy) propionic acid (MCCP)*, Dr. Gloria Post, NJDEP, February 7, 2007; *Procedure for Describing Process for Development of Analytical Practical Quantitation Levels (PQLs) for 2-(2-Methyl-4-chlorophenoxy) propionic acid.* R. Lee Lippincott, Ph.D, NJDEP, March 17, 2006.

References:

BASF, Aktiengesellschaft. 1985. MRID No. 00158359. Available from USEPA. Write to FOI, EPA, Washington DC 20460 (Cited in USEPA, 2002).

USEPA (2002). Integrated Risk Information System. 2-(2-Methyl-4-chlorophenoxy) propionic acid (MCPP) (CASRN 93-65-2). Last modified, 12/3/2002.