Ground Water Quality Standard for 2-Hexanone

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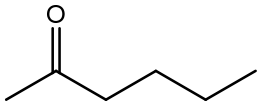
Summary of Decision: In accordance with the New Jersey Ground Water Quality Standards rules at N.J.A.C. 7:9C-1.7, the Department of Environmental Protection (Department) has developed an interim specific ground water quality criterion of 300 μg/L and PQL of 1 μg/L (ppb) for 2-hexanone. The basis for this criterion and PQL are discussed below. Pursuant to N.J.A.C. 7:9C-1.9(c), **the applicable constituent standard is 300 μg/L**.

2-Hexanone
methyl n-butyl ketone
Molecular Formula: $C_6H_{12}O$
Molecular Structure:



Background: 2-hexanone was evaluated by the U.S. Environmental Protection Agency's (USEPA) National Center for Environmental Assessment (NCEA, 1993), and a Reference Dose was derived. The Department has determined that this Reference Dose (RfD) is an appropriate basis for the ground water quality criterion.

Reference Dose: A Reference Dose (RfD) of 0.04 mg/kg/day was derived based on neurological effects seen in two studies in rats (Homan and Maronpot, 1978 and Eben et al., 1979).

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 0.04 mg/kg/day as the Reference Dose (as explained above), and standard default assumptions:

$$\frac{0.04 \text{ mg/kg/day} \times 70 \text{ kg} \times 0.2}{2 \text{ L/day}} = 0.28 \text{ mg/L (which rounds to 0.3 mg/L)} = \mathbf{300\ \mu g/L}$$

Where:
0.04 mg/kg/day = the derived RfD
70 kg = the assumed weight of an adult human
0.2 = the assumed relative source contribution (20%)
2 L/day = the assumed daily volume of water consumed.

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). 2-hexanone appears as a listed parameter in a published analytical Method, "USEPA 524.2, VOCs in Water by GC/MS" (see the National Environmental Methods Index (NEMI)). The limit of detection in the method is specified as 0.39 ppb. The spike level for this method was 1 ppb. Therefore, the Department has established a PQL of 1 ppb for 2-hexanone.

Conclusion: Based on the information provided above (and cited below), the Department has established an interim specific ground water quality criterion of 300 µg/L and a PQL of 1 µg/L (ppb) for 2-hexanone. Since the ground water quality criterion is higher than the PQL for this constituent, pursuant to N.J.A.C. 7:9C-1.9(c), **the applicable constituent standard for 2-hexanone is 300 µg/L** .

Technical Support Documents: *Interim Specific Ground Water Quality Criterion Recommendation Report for 2-Hexanone*, Dr. Gloria Post, NJDEP, August 17, 2007; *Procedure for Describing Process for Development of Analytical Practical Quantitation Levels (PQLs) for 2-Hexanone*, R. Lee Lippincott, Ph.D., NJDEP, February 26, 2003.

References:

Eben, A; Flucke, W; Mihail, F; et al. 1979. Toxicological and metabolic studies of methyl n-butylketone, 2,5-hexanedione, and 2,5-hexanediol in male rats. Ecotoxicol Environ Saf 3(2):204-217.

Homan, E.D. and Maronpot, R.R. 1978. Neurotoxic evaluation of some aliphatic ketones. Toxicol. Appl. Pharmaco. 45: 312.

NCEA. 1993. National Center for Environmental Assessment. "Risk Assessment Issue Paper for: Derivation of a Provisional RfD for 2-Hexanone (Methyl n-Butyl Ketone, CASRN 591-78-6)". U.S. Environmental Protection Agency. Washington, DC. June 24, 1993.