

Ground Water Quality Standard for 4,6-Dinitro-O-Cresol

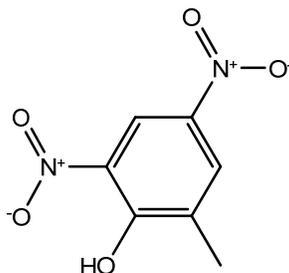
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CASRN# 534-52-1

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 0.7 µg/L and PQL of 1 µg/L for 4,6-dinitro-o-cresol. 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 1 µg/L.**

4,6-Dinitro-O-Cresol
Molecular Formula: $C_7H_6N_2O_5$
Molecular Structure:



Reference Dose: The National Center for Environmental Assessment (NCEA, 2002) Provisional Reference Dose (RfD) for 4,6-Dinitro-o-cresol is 1×10^{-4} mg/kg/day, based on several studies of humans ingesting the compound for up to one year.

Derivation of Ground Water Quality Criterion: The ground water quality criterion was derived pursuant to the formula established in the [New Jersey Ground Water Quality Standards rules](#) at N.J.A.C. 7:9C-1.7(c)4, using 1×10^{-4} mg/kg/day as the Reference Dose (as explained above), and standard default assumptions:

$$\frac{1 \times 10^{-4} \text{ mg/kg/day} \times 70 \text{ kg} \times 0.2}{2 \text{ L/day}} = 0.0007 \text{ mg/L or } 0.7 \text{ } \mu\text{g/L}$$

Where:

1×10^{-4} mg/kg/day = Reference Dose
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.

4,6-dinitro-o-cresol appears as a listed parameter in a published analytical method – “USEPA 528, Phenols in Water by GC/MS” (see [National Environmental Methods Index \(NEMI\)](#)). The limit of detection in the method is specified as 0.26 ppb. As explained above, a more conservative detection limit is established using a multiplier of five. $0.26 \text{ ppb} \times 5 = 1.3 \text{ ppb}$, which rounds to 1 ppb. Therefore, the Department has established a PQL of 1 ppb for 4,6-dinitro-o-cresol.

Conclusion: Based on the information provided above (and cited below), the Department has established an interim specific ground water quality criterion of 0.7 µg/L and a PQL of 1 µg/L (ppb). Pursuant to N.J.A.C. 7:9C-1.9(c), since the PQL is higher than the ground water quality criterion is for this constituent, **the applicable constituent standard for 4,6-Dinitro-O-Cresol is 1 µg/L .**

Technical Support Documents: *Interim Specific Ground Water Quality Criterion Recommendation Report for 4,6-Dinitro-o-cresol*, Dr. Gloria Post, NJDEP, August 17, 2007; *Procedure for Describing Process for Development of Analytical Practical Quantitation Levels (PQLs) for 4,6-Dinitro-o-cresol*], R. Lee Lippincott, Ph.D, NJDEP, May 6, 2004.

References:

NCEA. 2002. National Center for Environmental Assessment. Risk Assessment Issue Paper for: Derivation of a Provisional RfD for 4,6-Dinitro-o-cresol. U.S. Environmental Protection Agency. Washington, DC. CASRN 534-52-1. October 16, 2002.



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