



# Memorandum

**To:** DEQ Water Quality Staff

**From:** Water Quality Permitting and Program Development; updated by Aliana Britson

**Date:** 7/22/2024

**Subject:** Implementation Instructions for the Water Quality Criterion Dinitrophenols (CAS #: 25550-58-7)

This memo clarifies how the chemical group dinitrophenols (DNP) is measured in effluent and surface water to determine compliance with water quality criteria.

## Criterion summary

Oregon water quality standards include numeric criteria for dinitrophenols and one of its isomers, 2, 4 dinitrophenol, to protect human health and aquatic life (OAR 340-041-0033(3) and (4), and Tables 30 and 40). There are no associated aquatic life criteria (See table below).

Chemical	Human Health Criteria		Aquatic Life Criteria (Freshwater)		Aquatic Life Criteria (Saltwater)	
	Water + Org (µg/L)	Org Only (µg/L)	Acute (µg/L)	Chronic (µg/L)	Acute (µg/L)	Chronic (µg/L)
Dinitrophenols	62	530	---	---	---	---
Dinitrophenol 2, 4-	62	530	---	---	---	---

## Key issues

As referenced in the ATSDR<sup>1</sup>, dinitrophenols have 6 isomers:

1. 2,3-Dinitrophenol (66568)
2. 2,4-Dinitrophenol (51285)
3. 2,5-Dinitrophenol (329715)
4. 2,6-Dinitrophenol (573568)
5. 3,4-Dinitrophenol (577719)
6. 3,5-Dinitrophenol (586118)

The question raised was whether it is appropriate to add all the DNP isomers together and then compare the data results to the criteria for DNP. Review of the ATSDR toxicological profile indicates that the human health literature is largely limited to information on 2,4-DNP, with no minimum risk levels established for any of the other isomers.

The national recommended criteria for dinitrophenols was updated in 2015<sup>2</sup> and no longer

<sup>1</sup> ATSDR. [Toxicological Profile for Dinitrophenols](#).

<sup>2</sup> [Update of Human Health Ambient Water Quality Criteria: 2,4-Dinitrophenol 51-28-5 \(epa.gov\)](#)



includes a separate recommended criteria for 2,4 Dinitrophenol. The reference dose used in the updated national recommended criteria is based on the same 1986 EPA IRIS assessment for 2,4-Dinitrophenol as Oregon's current criteria. Oregon has not adopted the new recommended criteria. The 2,4 DNP is the isomer most in use industrially and the one most likely to be encountered.

## Implementation instructions

Dinitrophenols are not currently listed in Appendices D or J of 40 CFR 122. However, 2,4-Dinitrophenol is specifically listed in Appendix D and J of 40 CFR 122. Because evidence indicates that the criteria for Dinitrophenols and 2,4-Dinitrophenol were based on the same reference dose, 2,4-Dinitrophenol results will be used to evaluate the dinitrophenols water quality criteria for the purpose of implementation. Because the water quality criteria for dinitrophenols and 2,4-Dinitrophenol are the same, any analyses of 2,4-Dinitrophenol to assess reasonable potential, calculate limits, and/or evaluate compliance with a limit will be assumed to be equivalent to an analysis for dinitrophenols.

Because monitoring for 2,4-Dinitrophenol is already required for POTWS with a design flow greater than 1 MGD according to 40 CFR 122 Appendix J, the requirement for these same facilities to monitor for any pollutant with a state standards (40 CFR 122.21(j)(4)(iv)) will be considered satisfied in terms of monitoring for dinitrophenols.

## Conclusion

In summary, it is not appropriate to sum up the isomers of DNP to measure the DNP chemical group. Instead, DEQ recommends using 2,4-DNP as the surrogate measurement for DNP criteria because both DNP and 2,4 DNP utilize the same reference dose.

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800-452-4011 | TTY: 711 | [deqinfo@deq.oregon.gov](mailto:deqinfo@deq.oregon.gov)

Water Quality Permitting  
700 NE Multnomah Street, Suite 600, Portland, OR 97232  
503-229-5263, Toll-free in Oregon: 800-452-4011

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