State of Oregon
DEQ Department of Environmental Quality

Memorandum

To: **DEQ Water Quality Staff**

From: **Aliana Britson, Water Quality Permitting and Program Development**

Date: **9/25/2023**

Subject: Implementation Instructions for the Water Quality Criterion 1,2-Diphenylhydrazine (CAS # 122-66-7)

This memo clarifies how 1,2-diphenylhydrazine concentrations in effluent and surface water are measured to determine compliance with water quality criteria.

Criteria summary

Oregon water quality standards include numeric criteria for 1,2-diphenylhydrazine to protect human health (See table below). There are no corresponding aquatic life criteria.

Chemical	Human Health Criteria	
	Water + Org (µg/L)	Org Only (µg/L)
1,2-Diphenylhydrazine	**0.014**	**0.020**

Key issues

According to the 2020 ATSDR[1], under aerobic conditions 1,2-diphenylhydrazine rapidly decomposes into other chemicals and has a half-life in wastewater as short as 15 minutes. The decomposition of 1,2-diphenylhydrazine into its metabolites is highly dependent upon environmental conditions such as pH and the presence of other compounds. This makes the collection and analysis of 1,2-diphenylhydrazine extremely difficult. As a result, CFR 136 specifies that EPA 625.1 measure 1,2-diphenylhydrazine as azobenzene (CAS# 103-33-3), one of the decomposition chemicals of 1,2-diphenylhydrazine. Furthermore, 40 CFR 122 appendix D specifies that for industrial NPDES permittees 1,2-diphenylhydrazine be collected "as azobenzene".

Due to the fact that accurate modeling regarding decomposition information is unavailable and potentially highly variable, DEQ proposes to follow the convention laid out in 40 CFR 122 and 136 and use "azobenzene" as a surrogate for determining the amount of 1,2-diphenylhydrazine in a water sample.

[1] Agency for Toxics Substances and Disease Registry.

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Recommended analytical method

There are currently no 40 CFR 136 approved methods for 1,2-diphenylhydrazine or azobenzene. However, it is recommended to use EPA 625.1 since this method is 40 CFR 136 approved for other base-neutral compounds and also specifies that 1,2-diphenylhydrazine can be measured as an additional analyte.

Implementation instructions for NPDES permits

When evaluation of 1,2-diphenylhydrazine in either effluent or surface water is indicated as part of the permit application or renewal process, the permit writer will require monitoring for azobenzene. These results will be used as a surrogate to evaluate 1,2-diphenylhydrazine. If reasonable potential is found, a permit limit will be included in the permit for 1,2-diphenylhydrazine with the monitoring specified as azobenzene.

Conclusion

1,2-diphenylhydrazine is difficult to analyze given its rapid decomposition rate in water. Instead, azobenzene will be analyzed as an estimate of this chemical. Analytical results from azobenzene analysis will be directly compared to the applicable water quality criterion for 1,2-diphenylhydrazine.