

To: DEQ Water Quality Staff**Date:** November 28, 2014**From:** Jennifer Wigal, *Surface Water Management Section Manager*
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Andrea Matzke, *WQ Standards and Assessment Section***Subject:** Implementation Instructions for the Water Quality Criterion Nitrosamines (CAS#: 35576-91-1)

This memo clarifies how the chemical group nitrosamines are measured in effluent and surface water to determine compliance with water quality criteria. This memo does not affect the evaluation of criteria for the nitrosamine derivatives.

Criterion Summary

Oregon water quality standards include numeric criteria for nitrosamines and six additional nitrosamine derivatives to protect human health (See table below). Although there are no associated aquatic life criteria for nitrosamines or its derivatives, there are guidance only aquatic life values for nitrosamines. The human health criteria are significantly more stringent than the nitrosamines guidance values.

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)
Nitrosamines	0.00079	0.046	---	---	---	---
N-Nitrosodibutylamine	0.0050	0.022	---	---	---	---
N-Nitrosodiethylamine	0.00079	0.046	---	---	---	---
N-Nitrosodimethylamine	0.00068	0.30	---	---	---	---
N-Nitrosodi-n-propylamine	0.0046	0.051	---	---	---	---
N-Nitrosodiphenylamine	0.55	0.60	---	---	---	---
N-Nitrosopyrrolidine	0.016	3.4	---	---	---	---

Key Issues

The DEQ Lab found that the CAS number provided for the class nitrosamines (35576-91-1) is actually for nitrosamine, which is a discrete compound. Current lab methods do not analyze for nitrosamine, but instead measure target analytes of its derivatives—N-nitrosodimethylamine, N-nitrosodiphenylamine, etc. In addition, the lab was unable to find a supplier for nitrosamine, only the derivatives. EPA's current list of national recommended criteria does not include a CAS number for nitrosamines¹. The CAS number associated with nitrosamines on Table 40

¹ <http://water.epa.gov/scitech/swguidance/standards/current/index.cfm>

instead, reflects the CAS number from Table 33A.

In addition to the CAS number, another question was raised on whether it is appropriate to add all the nitrosamine derivatives together and then compare the data results to the criteria for nitrosamines. DEQ's toxicologist did not recommend adding the nitrosamine derivatives together because it appears that the major derivatives have somewhat different toxicities and cancer potencies. Therefore, the addition methodology is likely, not appropriate.

Inquiries to EPA Region 10² and EPA Headquarters indicate that there is no specific guidance on this chemical group and that because it is a non-priority pollutant, EPA does not anticipate re-examination of this criterion in the near future. However, EPA indicated that the same toxicity factor was used for both nitrosamines and N-nitrosodiethylamine, which is the most potent of the nitrosamine derivatives. The criteria for these chemicals are also identical.

Recommended Analytical Method

With the exception of nitrosamines, the recommended analytical methods for the six nitrosamine derivatives listed in the table are **EPA Methods 607, 625 or 1625B**. To determine the applicable quantitation limits for individual permit holders, please refer to Schedule B of the applicable permit. For older permits without quantitation limits in their Schedule B, please refer to Revision 3.0 of the [Reasonable Potential Analysis for Toxic Pollutants IMD](#) to determine applicable quantitation limits.

Implementation Instructions

Nitrosamines are not currently listed in *Appendices D or J of 40 CFR 122* and are not required as part of the federally mandated priority pollutant scan.

Since nitrosamines are listed as state water quality criteria, current policy as described in **Sections 2.2.2 and 2.2.4 of the RPA IMD rev. 3.1**, is to require monitoring and subsequent evaluation for pollutants when one of the conditions³ described in the RPA IMD occurs. In the event where monitoring for nitrosamines is indicated, staff are directed to require monitoring and analysis for N-nitrosodiethylamine in lieu of nitrosamines and use the resulting data as a surrogate when evaluating reasonable potential and calculating water quality based effluent limits.

The RPA Workbook has been set up with notations to this effect and will automatically use N-nitrosodiethylamine data in lieu of nitrosamines data.

Conclusion

In summary, it is not appropriate to sum up all the derivatives of nitrosamine to measure nitrosamines for the purposes of determining reasonable potential, given varying toxicities of the different derivatives. Additionally, current methods do not analyze for nitrosamine (CAS# 35576-91-1) and a standard could not be found. Instead, DEQ's policy is to analyze for N-nitrosodiethylamine as the surrogate measurement for nitrosamines when determining

² Matt Szelag, EPA Region 10 e-mail. November 2, 2011.

³ Generally, a pollutant is "known" to be present in the effluent due to factors such as source water contamination, industrial sources within the collection area, listing status of the receiving water body, or inclusion in a pretreatment program.

reasonable potential and calculating WQBELs. Moreover, there are six separate human health criteria for its derivatives, including the derivative that is considered to be the most potent (i.e. N-nitrosodiethylamine). Water quality staff will assess the need for nitrosamines criteria during the next review of human health criteria for toxics pollutants.