

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 Bis Chloromethyl Ether (CAS #: 542-88-1)

This memo clarifies how bis chloromethyl ether 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 bis chloromethyl ether (BCME) to protect human health. There are no corresponding 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)
Bis Chloromethyl Ether	0.000024	0.000029	---	---	---	---

EPA removed BCME from its list of priority toxic pollutants (40 CFR 423, Appendix A) on February 4, 1981, due to the fact that its “chemical properties did not justify its inclusion,” specifically citing bis chloromethyl ether’s half-life in water of 38 seconds at 20°C¹. While EPA no longer includes this pollutant as a priority toxic pollutant, EPA continues to include national recommended human health criteria for BCME as a non-priority pollutant².

¹ From <http://water.epa.gov/scitech/methods/cwa/pollutants-background.cfm>:

1. EPA removed three pollutants from the list in 1981, after determining that their chemical properties did not justify their inclusion:
 - o *Dichlorodifluoromethane* and *trichlorofluoromethane* were de-listed on January 8, 1981 (46 FR 2266) at the request of E.I. duPont de Nemours and Co. because of low solubility in water and high volatility combined with low human and mammalian toxicity. *Bis(chloromethyl) ether* was de-listed on February 4, 1981 (46 FR 10723) based on data that indicated a half-life in water of 38 seconds at 20°C.
2. De-listing the three pollutants did not change the 65 entries because the three de-listed pollutants were specific compounds within entries for the groups Halomethanes (list entry 38) and Haloethers (list entry 37).

² <http://water.epa.gov/scitech/swguidance/standards/current/index.cfm#C2>

Key Issues

Based on the chemical's rapid hydrolysis in water, there are no analytical methods to measure BCME in water samples. Currently, the only analytical techniques available for this compound are for air samples. Region 10 EPA staff queried³ its Manchester Environmental Lab in Port Orchard, WA about potential analytical methods for BCME. Staff at the lab confirmed that there is no EPA method for BCME because of its rapid degradation in water.

DEQ researched whether any breakdown products of BCME could be analyzed as an estimate for the amount of BCME in an original sample. The Agency for Toxic Substances and Disease Registry (ATSDR) report⁴ states that although there are adequate methods for the detection of formaldehyde and chloride (breakdown products of BCME), these methods are not likely to be useful for assessing exposure to BCME, since any change in the levels of these compounds would be well within normal biological variability. The ATSDR further states that the primary exposure from BCME to humans is inhalation of BCME vapors in the workplace.⁵ EPA's IRIS database also indicates that the carcinogenic oral estimate is derived from inhalation data because BCME is not likely to be found in water.

Recommended Analytical Method

At this time, due to the rapid decomposition of BCME in water samples, DEQ is unable to recommend an analytical method for this compound in water.

Implementation Instructions for NPDES Permits

Until such time that acceptable analytical methods are available for BCME, NPDES permit holders are not required to monitor for BCME or conduct reasonable potential analyses in order to meet the BCME human health criteria.

Conclusion

Given its rapid hydrolysis in water, there are no recommended analytical methods for BCME in

³ E-mail to Kathleen Collins, EPA Region 10, from Gerald Dodo, Supervisory Chemist EPA Region 10 Manchester Environmental Laboratory on 10/19/2012.

⁴ Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for Bis(chloromethyl) Ether. <http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=919&tid=188>

⁵ ATSDR. Toxicological Profile for Bis(chloromethyl) Ether. <http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=919&tid=188>.

"Because BCME is not currently used as an isolated material in this country, and because it is rapidly degraded in the environment, the probability of human exposure to BCME is low. The most likely means of exposure is inhalation of BCME vapors in the workplace during the production and use of chemicals such as CME, in which BCME may occur as a contaminant or be formed inadvertently. Inhalation of BCME in ambient air might also occur near such a facility, but there is no evidence that this occurs. Exposure through other media (water, food, soil) is unlikely to be significant."

"...BCME has not been detected in ambient waters, but has been reported to be present in groundwater at one chemical waste site being investigated under Superfund (CLPSD 1988). Because BCME hydrolyzes so quickly in water, this observation must be considered with skepticism."

water samples. Because BCME is not quantifiable in wastewater, DEQ will not require permit holders to monitor or conduct reasonable potential analyses for this toxic pollutant. Water quality staff will assess the need for BCME criteria during the next review of human health criteria for toxics pollutants.