State of Oregon

Department of Environmental Quality Memorandum

To: DEQ Water Quality Staff

From: **Water Quality Permitting and Program Development**

Date: September 7th, 2021

Updated By: Aliana Britson, *Water Quality Permitting and Program Development (9/7/2021)*

Subject: Implementation Instructions for Water Quality Criteria Chromium III (CAS #: 16065-83-1) and Chromium VI (CAS #: 18540-29-9). Version 2.0

This memo clarifies how chromium III (trivalent form) and chromium VI (hexavalent form) concentrations in effluent and surface water are measured to determine compliance with water quality criteria. For purposes of this memo, "chromium" indicates chromium III plus chromium VI. The term "total recoverable" indicates an unfiltered measurement, while "dissolved" indicates a filtered measurement.

Criterion Summary

Oregon water quality standards include numeric criteria for chromium III and VI (Table 30) to protect aquatic life (See Table 1 below). There are no associated human health criteria[1].

Table 1: Water Quality Criteria

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)
Chromium VI	---	---	16[C]	11[C]	1100[C]	50[C]
Chromium III	---	---	Calculate [C,F]	Calculate [C,F]	---	---
	[C] *Criterion is expressed in terms of "dissolved" concentrations in the water column.* [F] *The freshwater criteria for this metal is expressed as a function of hardness (mg/l) in the water column. To Calculate the criterion use formula under expanded* ***Endnote F*** *at bottom of* ***Table 30****.*					

Key Issues

In the water column, chromium consists primarily of trivalent and hexavalent forms. Laboratories (including the DEQ laboratory) typically report chromium unless analysis for chromium VI is requested. Hexavalent forms, which are generally produced by industrial sources, are considered to be more toxic than trivalent forms, which typically come from natural sources[2].

[1] EPA approved DEQ's withdrawal of the human health criteria for chromium III and chromium VI in June 2010. DEQ withdrew these criteria to be consistent with EPA's National Toxics Rule and 2002 nationally recommended CWA 304(a) criteria which determined that these criteria were no longer scientifically defensible.

[2] ATSDR. Toxicological Profile for Chromium. See: http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=62&tid=17

Recommended Analytical Method

Table 2 contains the list of applicable pollutant species and recommended analytical methods. To determine the applicable quantitation limits for individual permit holders, please refer to the current Recommended QL list on DEQ's website www.oregon.gov/deq

Table 2: Monitoring Guidance

Pollutant	Criteria Type	Pollutant Fraction	Recommended Analytical Method
Chromium	N/A	Total Recoverable	200.8
Chromium	N/A	Dissolved	200.8 + 0.45 µm filtration
Chromium VI	Aquatic Toxicity	Dissolved	218.6 + 0.45 µm filtration
Chromium III	Aquatic Toxicity	Dissolved	No recommended method. Results obtained by calculation

Implementation Instructions

If no chromium VI or chromium III data are available at time of permit renewal, total recoverable or dissolved (if available) chromium may be used as a conservative surrogate to complete analysis. Any WQBELs calculated using total recoverable chromium must be reviewed by the RPA subject matter expert and/or direct support. If chromium is identified as a pollutant of concern, monitoring for chromium VI and calculation of chromium III results must be included in the renewed permit.

Conclusion

Monitoring for and VI and calculation of chromium III results are required in cases where monitoring for chromium would be required. Chromium (dissolved or total recoverable) data results may be used as a conservative surrogate in cases where there are no analytical results based on chromium III or VI in order to complete the RPA.