

**To:** DEQ Water Quality Staff

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**Subject:** Implementation Instructions for Total Inorganic Arsenic Water Quality Criteria  
 (CAS #: 7440-38-2)

This memo clarifies how DEQ interprets arsenic concentrations in effluent and surface water to determine compliance with water quality criteria.

**Criteria Summary**

Oregon water quality standards include numeric criteria for arsenic to protect human health and aquatic life (OAR 340-041-0033(3) and (4), and Tables 30 and 40). Formerly, the arsenic criteria were in terms of “total recoverable,” but have since been updated to reflect the most toxic form of arsenic (inorganic arsenic).

The human health criteria (Table 40) are based on total inorganic arsenic, while the aquatic life criteria (Table 30) are based on dissolved inorganic arsenic. Table 1 below reflects the arsenic criteria as published in the rule.

**Table 1: Water Quality Criteria**

Pollutant	Table 40		Table 30			
	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)
<b>Arsenic (Inorganic)</b>	2.1 <sup>A</sup>	2.1 <sup>A</sup> (fresh) 1.0 <sup>A</sup> (salt)				
<b>Arsenic</b>			340 <sup>C,D</sup>	150 <sup>C,D</sup>	69 <sup>C,D</sup>	36 <sup>C,D</sup>

<sup>A</sup> The arsenic criteria are expressed as total inorganic arsenic. The “organism only” freshwater criterion is based on a risk level of approximately  $1 \times 10^{-5}$ , and the “water + organism” criterion is based on a risk level of  $1 \times 10^{-4}$ .  
<sup>C</sup> Criterion is expressed in terms of “dissolved” concentrations in the water column.  
<sup>D</sup> Criterion is applied as total inorganic arsenic (i.e. arsenic (III) + arsenic (V)).

**Key Issues**

The analytical method (1632A) used to analyze for inorganic arsenic (iAs) in effluent and surface water is not supported by many regional laboratories and is more expensive compared to typical metals scan methods.

Federal monitoring requirements in 40 CFR 122 also require facilities (domestic and industrial) to monitor for total arsenic (organic and inorganic) as part of their Tier 1 monitoring (priority pollutant screening) using analytical method 200.8. Currently, there are no state water quality criteria for total arsenic.

### **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 Schedule B of the relevant permit. For older permits without quantitation limits in Schedule B, please refer to Revision 3.0 of the [Reasonable Potential Analysis for Toxic Pollutants IMD](#) to determine applicable quantitation limits.

**Table 2: Monitoring Guidance**

<b>Pollutant</b>	<b>Criteria Type</b>	<b>Pollutant Species</b>	<b>Recommended Analytical Method</b>
<b>Arsenic</b>	N/A	Total Recoverable	200.8
<b>Arsenic</b>	Human Health	Total Inorganic	1632A
<b>Arsenic</b>	Aquatic Toxicity	Dissolved Total Inorganic	1632A + 0.45 µm filtration

### **Implementation Instructions for NPDES Permits**

*Option 1:* For all required monitoring, use the recommended analytical method for total iAs.

*Option 2:* Total recoverable arsenic data may be used as a surrogate measurement for total iAs water quality criteria to meet Tier 1 monitoring requirements. Permit writers must enter total recoverable arsenic results into the RPA Workbook to determine if arsenic is a Pollutant of Concern. In the event of an affirmative finding, the permittee can collect additional samples and analyze separately for the applicable iAs (total or dissolved) as part of the Tier 2 monitoring requirements and compare against the criteria (unless pre-existing data is already available).

*Option 3:* For total iAs water quality criteria, total arsenic recoverable data may be used as a surrogate measurement for both Tier 1 and 2 monitoring requirements. Consequently, DEQ permit writers use total recoverable arsenic data results to conservatively calculate reasonable potential and (if applicable) effluent limits to ensure attainment of total iAs water quality criteria.

### **Conclusion**

In summary, DEQ staff have the option to use total recoverable arsenic data as a surrogate for Tier 1 monitoring for iAs (total and dissolved). This will allow a permittee to minimize monitoring expenses. In the event that there are reported values in excess of the iAs water quality criteria, DEQ recommends that the permittee collect the applicable iAs data (total or dissolved) as part of the subsequent Tier 2 monitoring. Otherwise, DEQ staff must use total recoverable arsenic data to conservatively calculate reasonable potential and any needed effluent limits.