

July 14, 2021

Ms. Paula Wilson  
Idaho Department of Environmental Quality  
1410 North Hilton  
Boise, ID 83706

Dear Ms. Wilson:

The Idaho Association of Commerce & Industry (IACI) is the leading trade association of Idaho businesses and represents hundreds of employer members of all sizes engaged in diverse commercial and industrial enterprises through the state. The arsenic water quality criteria values are used to set cleanup/remedial objectives, total maximum daily loads (TMDLs), and requirements for IPDES permits and thus, these criteria are of direct interest to and have direct impact on, the IACI membership.

#### **A. Background**

The State of Idaho has collected an unprecedented amount of data looking at arsenic concentrations (both total and inorganic arsenic) in the water column and fish tissues. The State's 2019 dataset is exceptionally robust and represents a one-of-a-kind study given the large number of sampling locations and their geographic coverage. The objective of this study was to use the results to develop a bioaccumulation factor (BAF) for use in establishing human health water quality criteria for arsenic in Idaho waters.

Historically, BAFs have often been calculated simply as the ratio of the concentration of a substance in fish to the concentration of that substance in water. However, calculating a BAF in this manner, does not necessarily mean it serves as an accurate or appropriate predictor of actual bioaccumulation. Regression analysis represents a method to determine whether a relationship exists between water and fish tissue concentrations.<sup>1</sup> If a statistically significant relationship exists, that relationship can represent the BAF. The absence of a statistically significant relationship indicates that the concentration of a substance in fish tissue is not related to the concentration of the substance in surface water; thus, deriving a meaningful biologically-based BAF becomes problematic. As has been discussed in the negotiated rulemaking meetings, regression analysis of the State's paired data has shown that the relationship between water and fish tissue concentrations is non-existent or very weak for certain data subsets.

For a number of water quality parameters, the "regulatory model" assumes that water column and fish tissue concentrations are related. This "model" holds for most compounds; that is why BAFs are often considered integral to the water quality criteria derivation process. Based on the Idaho data set (and other information from the literature), arsenic does not conform well to this model. This factual situation calls for a different approach to develop a human health water quality criterion. Unfortunately, the "tool box" for alternative approaches is limited.

---

<sup>1</sup> Arcadis. 2018. Idaho Arsenic Human Health Criteria: Comments Prepared in Response to the April 19, 2018 Rulemaking Meeting. April 30, 2018.

The Department, on June 23, 2021 requested comments on this rulemaking including options for establishing the arsenic human health water quality criteria. IACI offers the following comments in addition to the extensive comments provided in August 2020 (IACI 2020)<sup>2</sup> that addressed the history of arsenic water quality criteria in Idaho, the regulatory framework for these standards and a thorough evaluation of data on arsenic in Idaho waters and fish.

## **B. Criterion for Fish Only (Recreation Use)**

### **B.1. Framework for Criterion:**

The State continues to propose a fish tissue criterion and no associated water column criterion. However, in response to written comments it received, the Department discussed four options (Table 1) for the Fish Only (Recreation Use) criterion framework at its June 23, 2021 meeting.

**Table 1  
Summary of Fish Only Criterion Framework**

<b>Option</b>	<b>Description</b>	<b>Notes</b>
<b>1</b>	<u>Fish tissue only</u> criterion	
<b>2</b>	<u>Water column only</u> criterion.	
<b>3</b>	<u>Dual criteria</u> : both water column and fish tissue criteria.	Tissue value would supersede water column value.
<b>4</b>	<u>Hybrid</u> : water column value as a “screening threshold” with fish tissue value as the criterion.	

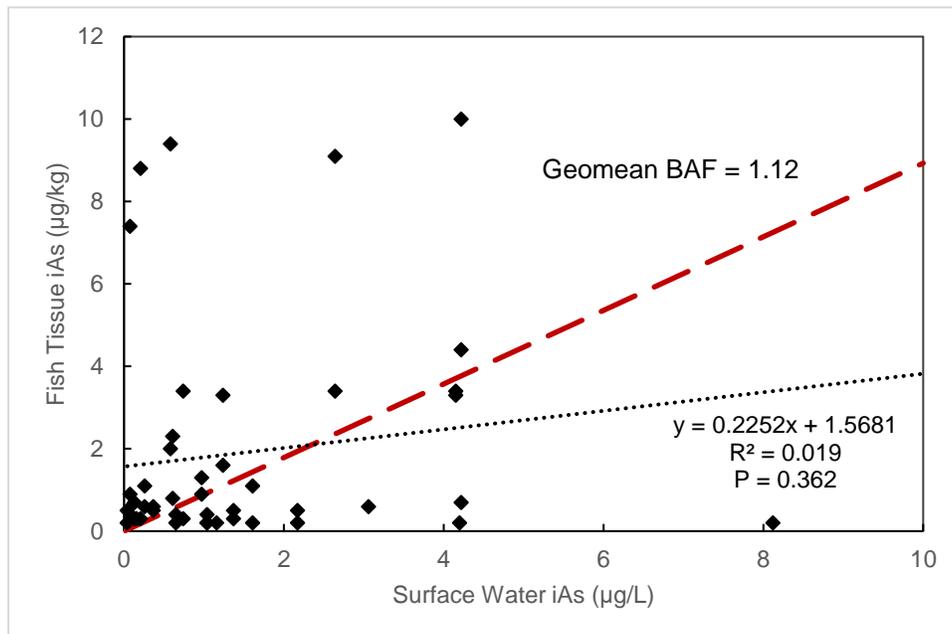
IACI believes that Option 1 provides a criterion framework that is protective of the specific designated use of human consumption of fish.

At this time, IACI is *not* recommending either a water column criteria or a screening threshold due to the difficulty of deriving a meaningful biologically-based bioaccumulation factor. As shown in Figure 1, the geometric mean BAF developed from all the paired surface water and fish tissue inorganic arsenic concentrations data is 1.12 L/kg (red dashed line). The relationship between inorganic arsenic in surface water and fish tissue is not statistically significant (black dotted line) and has an R<sup>2</sup> value of 0.019. Thus, the state-wide data set shows that lower inorganic arsenic surface water concentrations are not associated with lower inorganic arsenic fish tissue concentrations (and lower fish consumption exposures); the lack of such a relationship indicates that a water column criterion or a screening threshold is likely not appropriate for assuring protection of the fish consumption designated use.<sup>3</sup> [Note: as discussed during the June 23, 2021 meeting, there could be site-specific cases where such a relationship does exist and could be used for permitting and compliance purposes for such a location.] Thus, in the “aggregate” regulating inorganic arsenic concentration in surface water will not affect concentrations of inorganic arsenic in fish tissue or protect the beneficial use of recreation fish consumption.

<sup>2</sup> IACI 2020. Letter (with attachments) from Mr. Alex LaBeau to Ms. Paula Wilson. August 21, 2020.

<sup>3</sup> The same conclusions exist for inorganic arsenic in fish tissue and total arsenic concentrations in surface water. See Appendix C of the August 2020 comments.

**Figure 1**  
**Plot of Paired Surface Water/Fish Tissue Data with**  
**Regression-Based and Geometric Mean BAFs Shown**



**B.2 Criterion Value**

As to the criterion value, for fish tissue IACI recommends 8 µg/kg As<sub>(in)</sub>. This value is the same as proposed by the Department and is derived based on a bodyweight of 80 kilograms, a fish consumption rate of 66.5 grams per day for a lifetime, an acceptable excess lifetime cancer risk of 1x10<sup>-5</sup>, and the current USEPA cancer slope factor (CSF) of 1.5 (mg/kg-day)<sup>-1</sup> using the equation below:

$$Allowable\ concentration\ (8\ \mu g/kg) = \frac{Risk\ x\ BW}{FCR\ x\ CSF\ x\ CF}$$

Where:

- Risk = allowable risk, 1 x 10<sup>-5</sup>
- BW = body weight, 80 kg/person
- FCR = fish consumption rate, 0.0665 kg/person-day
- CSF = cancer slope factor, 1.5 mg/kg-day
- CF = conversion factor, 1,000 µg/mg)

**B.3. Implementation Specifics**

Rigorous implementation procedures in the Rules with details in guidance is important to assure that the recreation (fish consumption) beneficial use is maintained. The Implementation Guidance for the Idaho Mercury Water Quality Criteria (IDEQ April 2005) provides a good framework for how the Department could implement a fish tissue only criterion for inorganic arsenic. This Guidance describes how the Department will implement a fish tissue only criterion through statewide fish tissue monitoring, TMDL development, reasonable potential to exceed (RPTe) analysis, IPDES (NPDES) permitting, BMPs in lieu of numeric limits, site specific criteria development, variances, water quality trading, fish advisories and antidegradation requirements.

The approaches in the Mercury Implementation Guidance can be used to implement a fish tissue only standard for inorganic arsenic in a way that will protect the recreation (fish consumption) beneficial uses. Key concepts from this guidance include:

- The State should utilize the Beneficial Use Reconnaissance Program (BURP) (or a similar program), to periodically measure inorganic arsenic fish tissue concentrations in Idaho's waters.
- Similar to the mercury effluent monitoring guidance, a monitoring framework for fish tissue should be established.<sup>4</sup> Elements of that framework should include:
  - An evaluation of the permittees' discharge to determine if there is the potential for greater than *de minimus* concentrations of arsenic in the effluent. If no potential exists, then there is no need to collect additional fish tissue data.
  - For dischargers that have the potential for non *de minimus* concentrations of arsenic in the effluent, existing fish tissue data collected by the permittee, the State or other party should be examined to determine compliance with the criterion.
  - If no fish tissue data are available for a discharger, then the discharger and other dischargers in the same watershed, should work with DEQ to put in place the fish tissue sampling needed for purposes of determining attainment of the criterion and for IPDES monitoring purposes.
  - Fish tissue monitoring for subsequent IPDES permit cycles should be dependent upon results from prior fish tissue monitoring done by either the permittee or other parties in the watershed of the discharger.
  - A minimum of five (5) fish of the same species shall be analyzed for inorganic arsenic to satisfy the fish tissue monitoring requirement.
  - For exceedances of the tissue criterion, a Best Management Practices (BMP) approach, similar to what is in place for mercury, may be appropriate.

### **C. Criterion for Fish + Water (Water Supply and Recreation Uses)**

#### **C.1. Criterion Framework**

The Department has proposed that the criterion framework for the Fish + Water designated use would include both a water column and fish tissue value. Thus, the criterion would be attained if both the fish tissue value and water column value is less than or meets the applicable criteria.

IACI supports this framework proposal. A combination of criteria are needed given the absence of a biologically meaningful and statistically significant relationship between inorganic arsenic concentration in Idaho surface waters and fish tissue.

#### **C.2. Criterion Values**

For this combination criterion approach, the Department has proposed that the fish tissue value be 8 µg/kg As<sub>(in)</sub> and that the water column concentration meet the maximum contaminant level (MCL) for inorganic arsenic (IDAPA 58.01.08). IACI supports these proposed values.

The basis of the fish tissue value (8 µg/kg As<sub>(in)</sub>) has already been described in these comments.

For the water column value, the MCL is appropriate as the criterion. The MCL represents a concentration of arsenic in domestic drinking water that USEPA has determined is safe. Its adoption as the water and organism human health water quality criterion is not precedent

---

<sup>4</sup> See Figure 4-3 of Implementation Guidance for the Idaho Mercury Water Quality Criteria, Idaho Department of Environmental Quality, April 2005.

setting in any way as 16 other states use the MCL of 10 µg/L As<sub>(in)</sub> as their water and organism human health water quality criteria. Thirteen other states have a domestic water supply designated beneficial use and use the MCL of 10 µg/L As<sub>(in)</sub> as the human health water quality criteria for those water bodies.<sup>5</sup>

### C.3. Implementation Specifics

- The Beneficial Use Reconnaissance Program (BURP) could be utilized to periodically measure inorganic arsenic in the water column in Idaho waters.
- If the water column or fish tissue criteria are exceeded, then IPDES dischargers and other sources will need to be evaluated as to their potential contribution to the exceedance. For exceedances of the water quality criterion, modification of IPDES effluent limits may address the problem. For exceedances of the tissue criterion, a Best Management Practices (BMP) approach, similar to what is in place for mercury, may be appropriate.

## **D. Background Concentrations and Additional Implementation Approaches**

### D.1 Background Arsenic Concentrations

One of the challenges in implementing human health water quality criteria for arsenic is that arsenic occurs naturally in soils and waters in the West, including Idaho. Highly mineralized areas are present throughout the state, including some sites that have had prior development and others which could be candidates for future responsible natural resource investment. The Idaho Department of Water Resources published a very comprehensive review of the geological origin of arsenic in Idaho.<sup>6</sup> This study included data from measurements of arsenic in groundwater at 255 sites. Fifteen percent (15%) of the sites sampled had arsenic concentrations greater than 10 µg/L. Previous studies conducted by the Department have shown total arsenic (As<sub>(total)</sub>) concentrations in surface water that range from less than 1 microgram per liter (µg/L) up to 17 µg/L.<sup>7</sup>

### D.2. General Implementation Approaches

Because of these naturally occurring arsenic concentrations, a “tool box” of different implementation approaches is needed. Idaho’s water quality rules also have several “implementation tools” that might be of assistance to the regulated community in the implementation of any new arsenic criteria. Potential “tools” include variances, intake credits, use attainability analysis, natural background concentrations, pollutant trading, utilization of Best Management Practices (BMPs) in lieu of numeric limits and allowance for site-specific criteria. Site specific criteria and mechanisms to allow future activities at highly mineralized and/or legacy sites are important. This includes sites where there are ongoing CERCLA cleanups.

*Variances* could be helpful for locations due to legacy conditions and natural background conditions. A variance (unless specifically described in the rules) would need to be re-issued in conjunction with a discharge permit renewal, which is typically every five (5) years. Because it is unlikely that arsenic concentrations in a receiving water would have changed during the term of a permit, the variance process would need to be repeated for every five (5) year permit renewal cycle.

---

<sup>5</sup> See Tables 4 and 5 of IACI’s August 21, 2020 comments.

<sup>6</sup> Idaho Department of Water Resources. 2002. Technical Summary Arsenic Results from the Statewide Program, 1991-2001.

<sup>7</sup> Essig, D. 2010. Arsenic, Mercury and Selenium in Fish Tissue and Water from Idaho’s Major Rivers: A Statewide Assessment. Idaho Department of Environmental Quality. March 2010.

*Intake credits*, may be helpful for discharges using the receiving water as a source water. However, such an approach may not help dischargers who are using groundwater with naturally elevated groundwater concentrations as a source water. Naturally occurring arsenic concentrations in groundwater throughout much of Idaho exceed do exceed the MCL at a number of locations in the State.

Natural background is recognized as a *site-specific human health water quality criteria* when natural background exceeds a numeric health based water quality criteria. Such an approach needs to describe practical methods to the establish site-specific background value, consider the variability of naturally occurring concentrations, and allow for some de minimis increase in receiving water concentration downstream of a discharge. Also, it may be possible to utilize different risk factors in setting a site-specific standard.

The *Use Attainability Analysis* (UAA) process could also be utilized to revise the designated uses or criteria being applied to a specific water to more accurately reflect site conditions, actual beneficial uses, and/or account for elevated background concentrations.

Due to legacy or natural conditions, the utilization of a *Best Management Practices* (BMP) approach instead of numeric criteria may be appropriate.

*Water quality trading*. The State of Idaho's primacy over Clean Water Act point source permitting presents opportunities for new approaches with the regulated community. IACI observes that market-based approaches to incentivize better water quality outcomes have been underutilized.

Current EPA Guidance, *Updating the Environmental Protection Agency's (EPA) Water Quality Trading Policy to Promote Market-Based Mechanisms for Improving Water Quality* (2019) strongly supports water quality trading and other market-based programs that can promote water quality improvements on a cost-effective basis. EPA suggested six principles that Idaho could use to develop broader application of water quality trading, each of which could be incorporated into an approach that fits with the often unique hydrologic features of the Gem States watersheds:

1. Consideration of implementation of water quality trading and other market-based programs on a watershed scale;
2. Use of adaptive management strategies for implementing market-based programs;
3. Water quality credits and offsets banking for future use;
4. Simplicity and flexibility in implementing baseline concepts;
5. Single project generation of credits for multiple markets; and
6. Development of financing opportunities to assist with deployment of nonpoint land use practices.

IACI commends this EPA Guidance to the Department and welcomes further discussion on an approach that works for Idaho as a lawful approach to improving water quality, because, as stated in the Guidance at page 3, "[m]arket-based programs intended to facilitate compliance with effluent limits and other legal requirements must comply with the Clean Water Act."

## **E. Summary**

Human health criteria for surface water need to consider not only drinking water consumption but "fish consumption and bioaccumulation".<sup>8</sup> As the Department's robust data set has

---

<sup>8</sup> See 65 Fed. Reg. 66444,66450.

demonstrated, in the “aggregate” bioaccumulation of inorganic arsenic and associated fish consumption exposures are not influenced by inorganic arsenic concentrations in surface water. Therefore, a different framework than the standard “water quality criteria regulatory model” is needed for establishing arsenic human health water quality criteria that are protective of the beneficial uses. As shown in Table 2, this framework needs to include a fish tissue criterion (for recreation - Fish Only beneficial use). The Fish + Water criteria needs to include both a water column value and a fish tissue value to account for ingestion of both water and fish.

The rule does need to include key aspects of implementation, especially to assure the attainment of the recreation (fish consumption) beneficial use. The majority of the implementation approaches discussed in these comments, are consistent with Idaho’s Mercury Implementation Guidance. This very robust guidance can be tailored to provide the needed implementation procedures detail for the arsenic human health water quality criteria. Such an approach should be acceptable to EPA as they approved Idaho’s fish tissue only standard for mercury (which included this detailed implementation guidance) as protecting beneficial uses.

**Table 2**  
**Summary of Recommendations**

Criterion	Matrix	Value
Recreation (organism/fish only)	Fish Tissue	8.0 µg/kg As <sub>(in)</sub> - dw
Water Supply and Recreation (water and fish) (a)	Water	10.0 µg/L As(in)
	Fish Tissue	8.0 µg/kg As(in)- dw

(a) For Water Supply and Recreation designated use, both the water column and fish tissue values have to be met to demonstrate attainment.

NOTE: Criteria needs to include an outline for fish tissue monitoring requirements.

We appreciate the opportunity to submit these comments. Please let us know of any questions you have.

Sincerely,



Alex LaBeau  
President

cc: Alan Prouty, Chair  
IACI Environment Committee