

**Toxic Tales – Impact of Revised Toxic Water
Quality Standards on Oregon Municipal
Treatment Plants**

**Using the Intake Credit -
Data Needs and
Considerations**



**Part B Workshop
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Overview: Using the Intake Credit - Data Needs and Considerations

- Federal NPDES Regulations
- OAR 340-045-0105 Intake Credits
- Draft Internal Management Directive
 - Reasonable Potential Analysis Process for Toxic Pollutants Version 3.1
- Example



Why Consider Intake Credits?

Wastewater Discharge

- Potential Water Quality Based Effluent Limits
 - Reasonable Potential for Effluent to Exceed Water Quality Standards
 - Pollutant Present in Effluent Discharge
 - Ambient Water Quality Exceeds Surface Water Standards, or
 - Combination Exceeds Standards
- Wastewater Source is Water Supply
 - Little or No Other Contribution of Pollutant

Water Supply

- Source of Pollutant
 - Concentrations Less Than SDWA Standards
 - Concentrations Exceed Surface Water Quality Standards
- Presence in Wastewater Results from Source of Supply

Mechanism to reconcile effluent limits with source of pollutant

Potential Contradiction in Standards

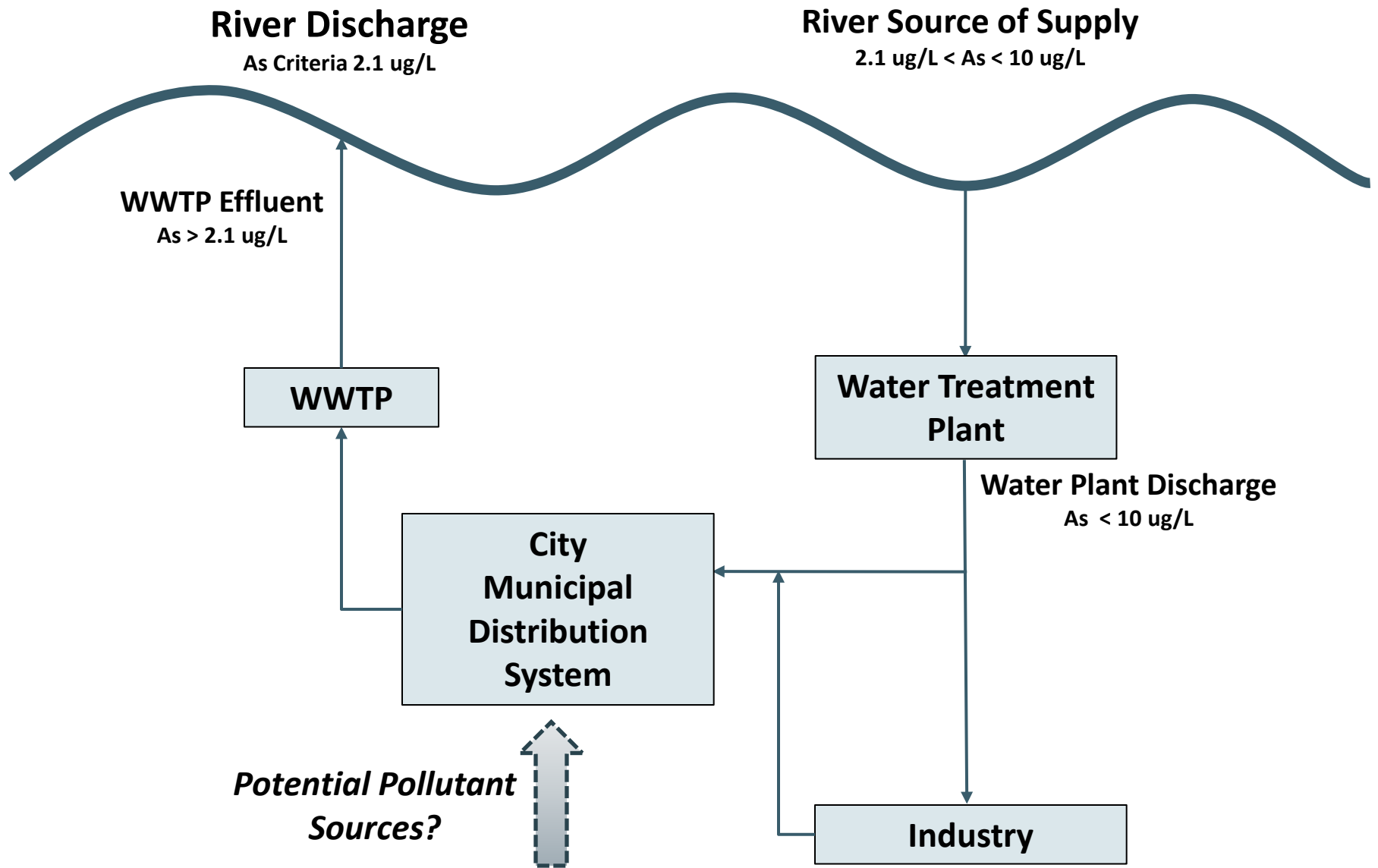
Example: Arsenic Standards

SDWA 10 ug/L

Water Quality Criteria 2.1 ug/L



Natural Background Conditions, Legacy Contamination, Dissimilar Basis for Standards, Standards Out-of-Sync, etc



- *Pollutant Source is Natural Background*
- *Drinking Water Meets SDWA*
- *Wastewater Effluent Discharge Exceeds Surface Water Criteria*
- *Effluent Limits?*

Wastewater Utility Implications of New Water Quality Standards

Facility Implications

- Significant Pollutant Source is Water Supply
- Potential Effluent Limits
 - Basis for Effluent Limits?
- Treatment to Meet Standards
 - Add Advanced Treatment?
 - Define Effluent Performance Requirements

Regulatory Tools

- Intake Credits
 - Facility Responsible for Direct Impacts on Water Quality
 - Deduct Intake Pollutant Quantity
 - Reasonable Potential?
 - Water Quality Based Effluent Limits?
 - Account for Intake Credit
- Site Specific Water Quality Criteria
- Water Quality Variance
- Use Attainability Analysis
- TMDL

Federal NPDES Regulations




40 CFR 122.45 Calculating NPDES Permit Conditions

(g) Pollutants in intake water.

(1) Upon request of the discharger, technology based effluent limitations or standards shall be adjusted to reflect credit for pollutants in the discharger's intake water if:

(i) The applicable effluent limitations and standards contained in 40 CFR subchapter N specifically provide that they shall be applied on a net basis; or

(ii) The discharger demonstrates that the control system it proposes or uses to meet applicable technology-based limitations and standards would, if properly installed and operated, meet the limitations and standards in the absence of pollutants in the intake waters.



40 CFR 122.45 Calculating NPDES Permit Conditions - continued

- (3) Credit shall be granted only to the extent necessary to meet the applicable limitation or standard, up to a maximum value equal to the influent value. Additional monitoring may be necessary to determine eligibility for credits and compliance with permit limits.
- (4) Credit shall be granted only if the discharger demonstrates that the intake water is drawn from the same body of water into which the discharge is made. The Director may waive this requirement if he finds that no environmental degradation will result.

**Oregon
Administrative Rules
340-045-0105**

Oregon Administrative Rules 340-045-0105 Intake Credits

- Intake Pollutant
 - Amount of pollutant present in public waters at the time it is withdrawn by discharger
- Provisions of OAR 340-045-0105 Apply:
 1. Determining reasonable potential
 2. Establishing water quality based effluent limits (WQBELs)
- From Same Body of Water as Discharge
 - Reached the vicinity of the outfall point
 - Groundwater may be considered
 - Within a reasonable period
 - Receiving water background concentration similar to intake
 - Direct hydrological connection
 - Similar water quality characteristics

OAR 340-045-0105: Consideration of Intake Pollutants in Determining Reasonable Potential

- DEQ Determines “*No Reasonable Potential*” for Discharge to Cause or Contribute to Excursion of WQS
 - 100% Intake Water from Same Body as Discharge
 - *Facility Does Not:*
 - Contribute Any Additional Mass of Intake Pollutant
 - Adversely Alter Pollutant Chemically or Physically
 - Increase Concentration at Edge of Mixing Zone Compared to Intake Water
 - Cause Adverse Impacts Due to Discharge Timing and Location that Would Not Occur if Intake Pollutant Left In-stream

If DEQ Determines “No Reasonable Potential”

- Water Quality Based Effluent Limits Not Required, Provided:
 - NPDES Permit Evaluation Report Documents Determination
 - Influent, Effluent and Ambient Monitoring Required to Document
 - Permit Re-opener Clause
 - Modification or Revocation Based on New Information Showing Conditions No Longer Met

OAR 340-045-0105: Consideration of Intake Pollutants in Establishing Water Quality Based Effluent Limits (WQBELs)

- Discharger Demonstration
 - 100% Intake Water Pollutant from Same Body as Discharge
 - Ambient Background and Intake Concentration Exceed Water Quality Criterion
 - Facility Does Not:
 - Alter Pollutant Chemically or Physically to Cause Adverse Impacts
 - Increase Pollutant Concentration at Point of Discharge Compared to Intake Water Concentration
 - Cause Adverse Impacts Due to Discharge Timing and Location that Would Not Occur if Intake Pollutant Left In-stream

Oregon DEQ May Establish WQBELs – 1

- Allow Discharge Mass and Concentration No Greater than Intake Water
 - Discharger May Add Mass If An Equal or Greater Mass Removed Prior to Discharge
 - No Net Pollutant Addition
 - Establish Limitations that Reflect Mass and Concentration Achieved by Treatment
- Drinking Water Treatment Removal
 - Intake Concentration Where Water Enters Distribution System

Oregon DEQ May Establish

WQBELs – 2

- Multiple Intake Sources
 - DEQ May Flow-weight Each Source
- Specify Compliance Assessment for Mass and Concentration Limits
 - Effluent Limits Based on Background Data
 - Monitoring Intake and Effluent Concentrations
- Other Caveats
 - Technology-based Requirements
 - Anti-degradation Policies
 - Independent Consideration of WET and Biological Assessments
 - Consistent with TMDL Wasteload Allocations

Oregon DEQ Draft Department Rules

Oregon DEQ Draft Internal Management Directive

- Reasonable Potential Analysis Process for Toxic Pollutants Version 3.1
 - Appendix F: Intake Credits
- *Guidance on Use of Intake Credits for:*
 1. Determining Reasonable Potential (RP)
 2. Establishing Water Quality Based Effluent Limits (WQBELs)

Reasonable Potential (RP) Threshold Conditions – Satisfy 5 Conditions

- 1. The facility withdraws 100 percent of the intake water containing the pollutant from the same body of water into which the discharge is made*
- 2. The facility does not contribute any additional mass of the identified intake pollutant to its wastewater Mass Conditions*
- 3. The facility does not alter the identified intake pollutant chemically or physically in a manner that would cause adverse water quality impacts to occur that would not occur if the pollutants were left in-stream*
- 4. The facility does not increase the identified intake pollutant concentration at the edge of the mixing zone, or at the point of discharge if a mixing zone is not allowed, as compared to the pollutant concentration in the intake water, unless the increased concentration does not cause or contribute to an excursion above an applicable water quality standard*
- 5. The timing and location of the discharge would not cause adverse water quality impacts to occur that would not occur if the identified intake pollutant were left in-stream*

Establishing Water Quality Based Effluent Limits (WQBELs) – Satisfy 5 Conditions

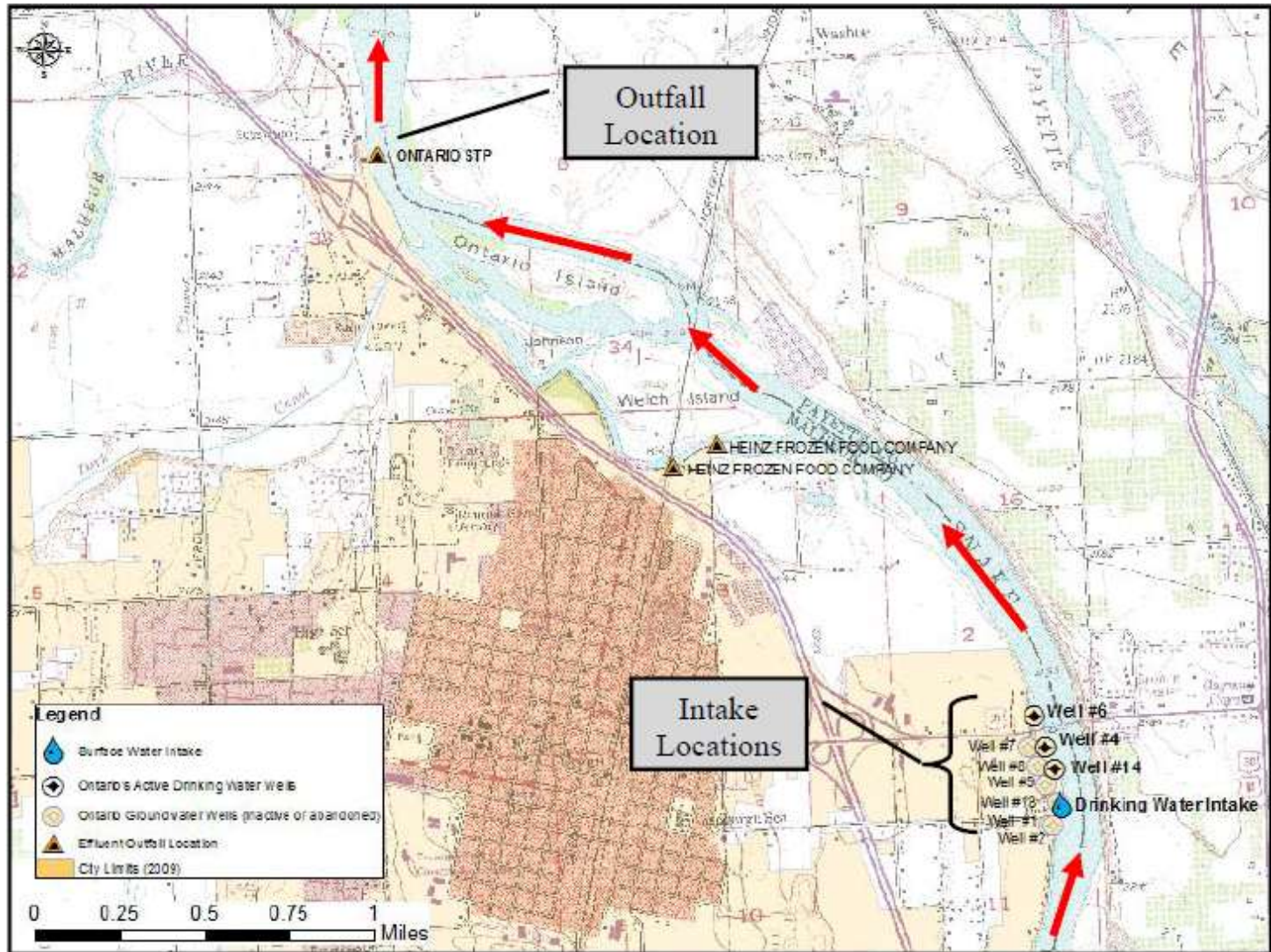
6. *The facility withdraws 100 percent of the intake water containing the pollutant from the same body of water into which the discharge is made*
7. *The observed maximum ambient background concentration and the intake water concentration of the pollutant exceeds the most stringent applicable water quality criterion for that pollutant*
8. *The facility does not alter the identified intake pollutant chemically or physically in a manner that would cause adverse water quality impacts to occur that would not occur if the pollutants were left in-stream*
9. *The facility does not increase the identified intake pollutant concentration, as defined by the department, at the point of discharge as compared to the pollutant concentration in the intake water*
10. *The timing and location of the discharge would not cause adverse water quality impacts to occur that would not occur if the identified intake pollutant were left in-stream*

Intake Credit Procedure for Permit Writer's

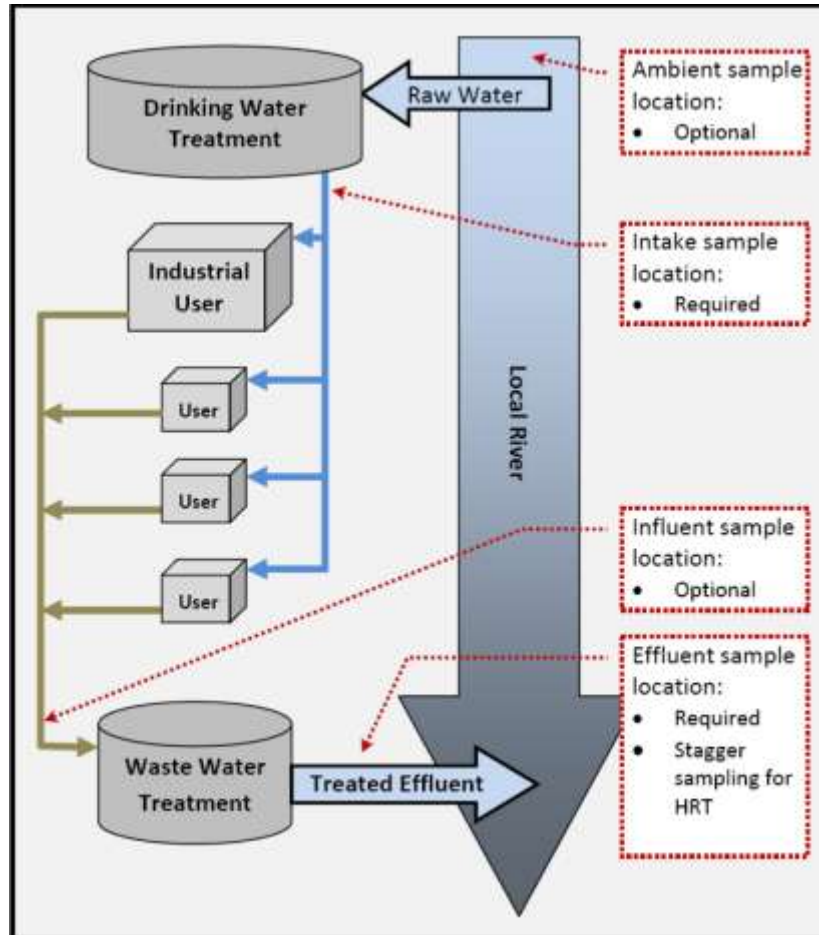
- Reasonable Potential Threshold Evaluation
 - Step 1: Collect Available Data
 - Focus on Supporting:
 - Reasonable Potential Analysis
 - WQBELs
 - Presumption is Existing Data Inadequate
 - Step 2: Sampling Plan
 - Quantify Mass and Concentration of Intake Waters and Effluent
 - Record Flow Rates
 - Hydrologic Residence Time
 - Assess Physical and Chemical Changes
 - Consider Monitoring Ambient Source Water and Treatment Facility Influent

***Anticipate Future Data Needs to Support Additional Regulatory Solutions
Water Quality Variances, Site Specific Criteria, UAA, TMDLs, etc.***

Example Intake Credit Evaluation Map



Example Sampling Plan



- OAR 340-045-0105 Required Sampling
 - Intake Sample = Treated Drinking Water
 - Effluent Sample = Treated Effluent
- Suggested Optional Sampling
 - Ambient Raw Water Source
 - Understand System Mass Balance
 - Influent Wastewater
 - Understand Process Effectiveness
 - Collection System
 - Potential Pollutant Sources

Example of Sampling Plan Elements for Inorganic Arsenic in a POTW

Required Elements

- *7 consecutive 24-hour composite samples for:*
 - *Intake location (treated drinking water)*
 - *Effluent (may stagger sampling time from Intake by 2 days to account for system residence time)*
- *Continuous flow monitoring for the intake and effluent location during the monitoring period*
- *Analyze all samples for Inorganic Arsenic*
- *Split 2 of the aforementioned sampling events (both intake and effluent) and analyze for Total Arsenic, Inorganic Arsenic, Arsenic III, Arsenic V, pH, temperature, DO and hardness*

Optional Elements

- *7 consecutive 24-hour composite samples for:*
 - *Ambient location (Raw water intake)*
 - *Influent (may stagger sampling time from Intake by 2 days to account for system residence time)*
- *Analyze all samples for Inorganic Arsenic*
- *Continuous flow monitoring for the influent location during the monitoring period*

Reasonable Potential Analysis

- Assess Condition #4
 - 4. *The facility does not increase the identified intake pollutant concentration at the edge of the mixing zone, or at the point of discharge if a mixing zone is not allowed, as compared to the pollutant concentration in the intake water, unless the increased concentration does not cause or contribute to an excursion above an applicable water quality standard*

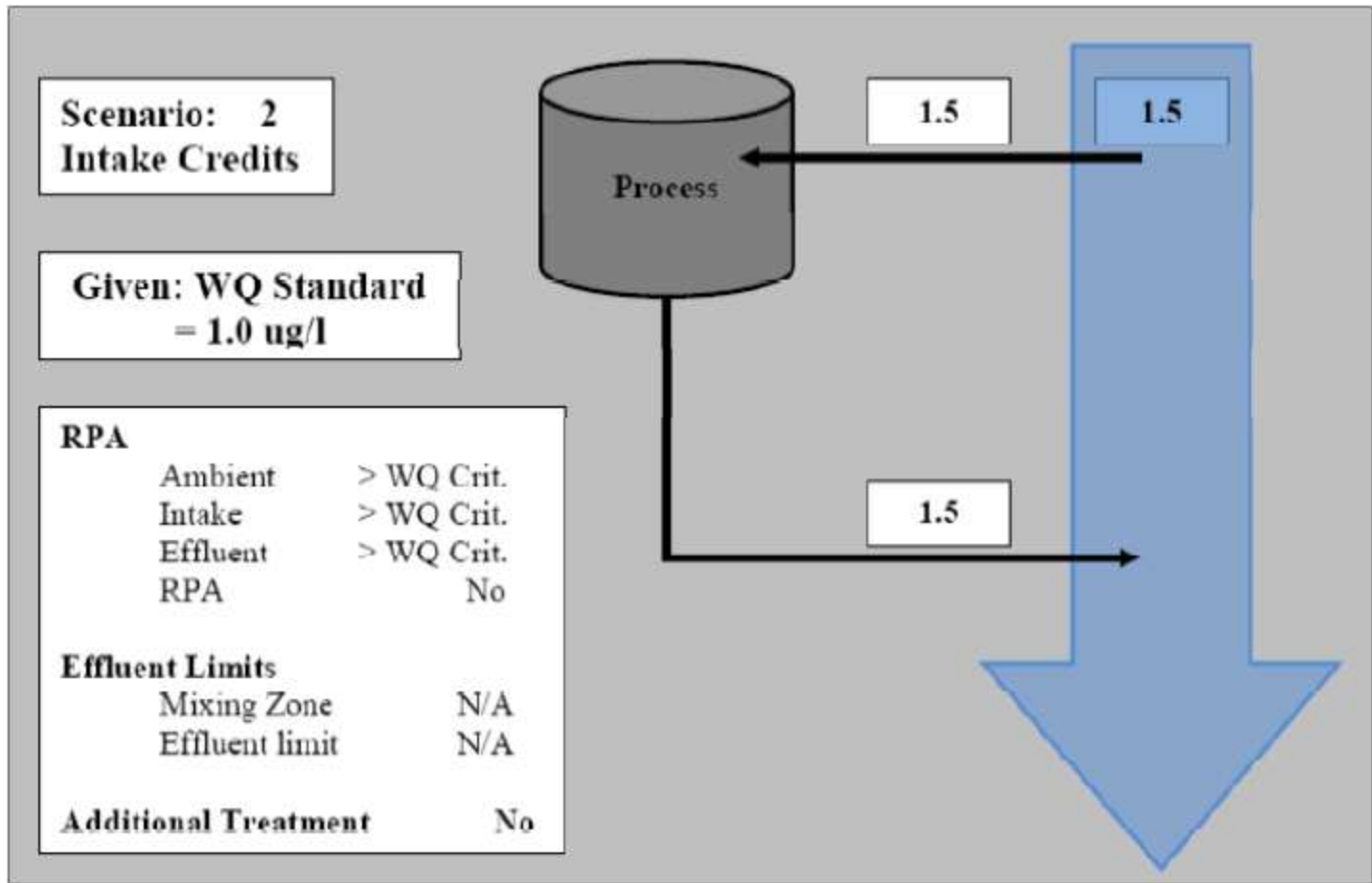
Intake Credit Procedure for Permit Writer's

- Conducting Reasonable Potential Analysis Using Intake Credit
 - Step 3: Apply Intake Credit
 - Check That Intake Credit Greater, or Equal, to Effluent Concentration
 - Test Reasonable Potential
 - If No RP, No WQBEL Necessary
 - If Yes RP, WQBELs Needed

Intake Credit Procedure for Permit Writer's

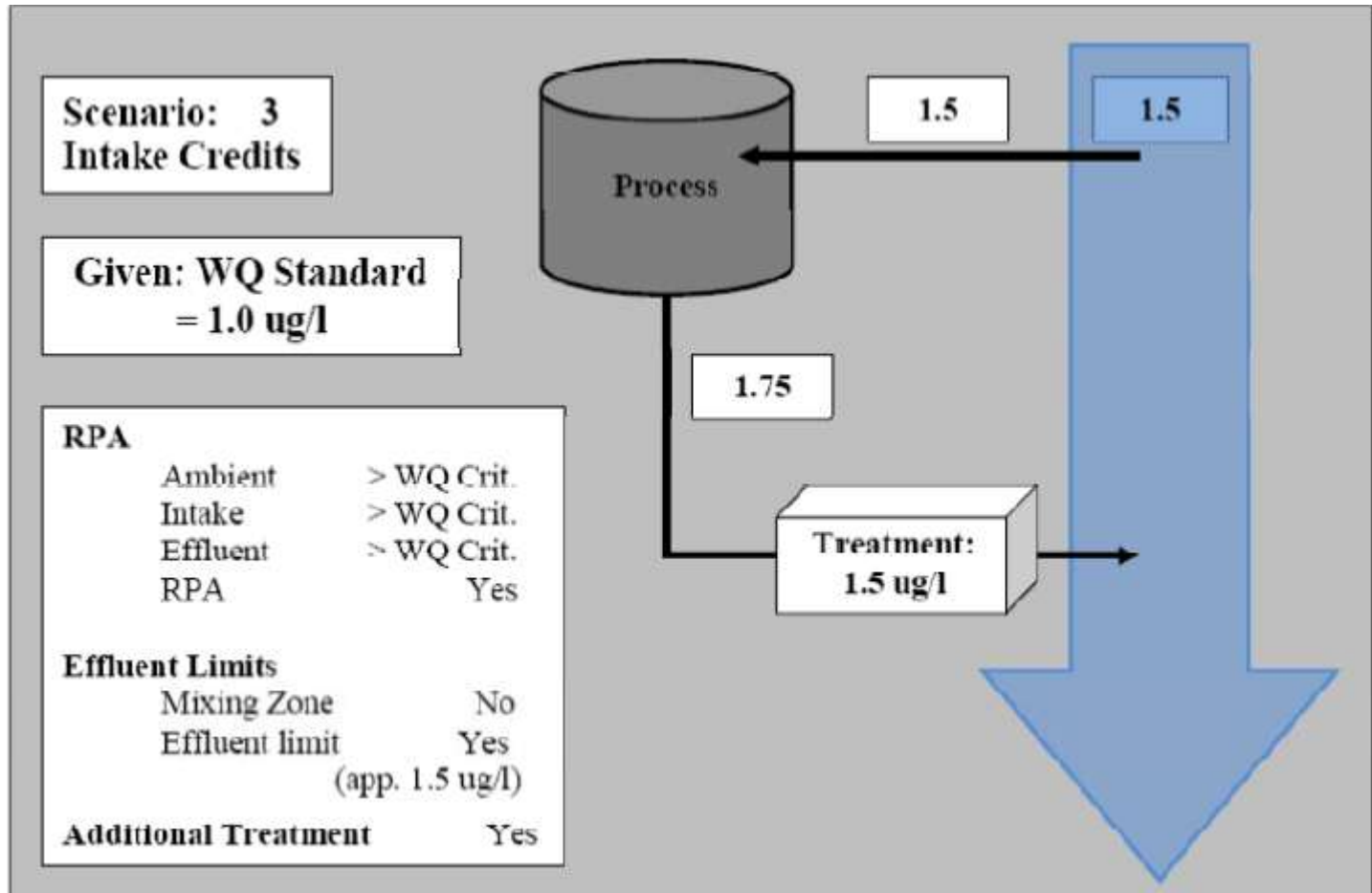
- Establishing Water Quality Effluent Limits Threshold Evaluation
 - Step 4: Evaluate Threshold Conditions
 - Condition #7: Limit Use of Intake Credit to “Water Quality Limited” Waters
 - Condition #9: Facility Doesn't Increase Intake Pollutant Concentration
- Calculating Aquatic Toxicity Effluent Limits Using Intake Credit
 - Step 5: Calculate WQBELs

Potential Intake Credit Scenario



***No Reasonable Potential
No Additional Treatment Required***

Potential Intake Credit Scenario



*Reasonable Potential
New Effluent Limits(Greater Than WQS)
Additional Treatment Required*

Case Study

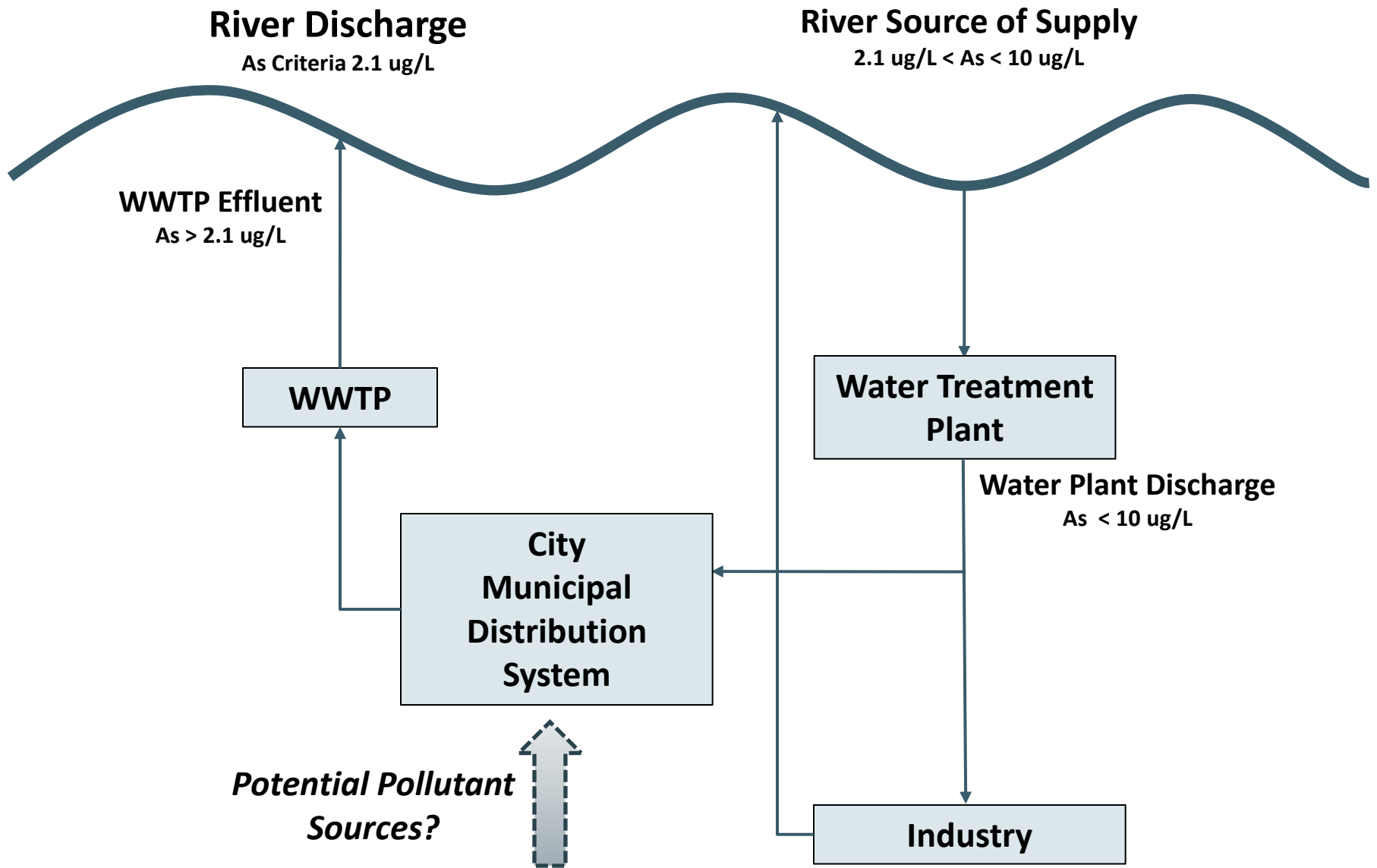
Intake Credit Case Study

Scenario - Arsenic

- Wastewater Discharge Exceeds WQS

Regulatory Tools

- Intake Credit
 - Reasonable Potential Analysis
 - Water Quality Based Effluent Limits



- *Pollutant Source is Natural Background*
- *Drinking Water Meets SDWA*
- *Wastewater Effluent Discharge Exceeds Surface Water Criteria*
- *Effluent Limits?*

River Discharge

As Criteria 2.1 ug/L

River Source of Supply

2.1 ug/L < As < 10 ug/L

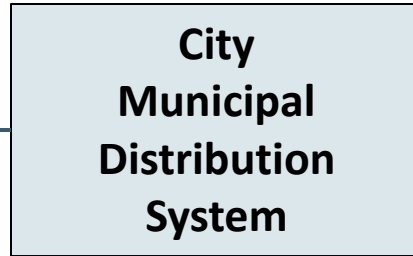


**Summer – WWTP
Land Application
(May through October)**

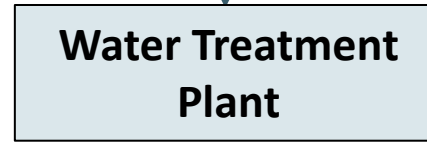
Industrial Effluent
As > 2.1 ug/L



WWTP

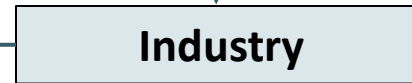


**City
Municipal
Distribution
System**



**Water Treatment
Plant**

Water Plant Discharge
As < 10 ug/L



Industry

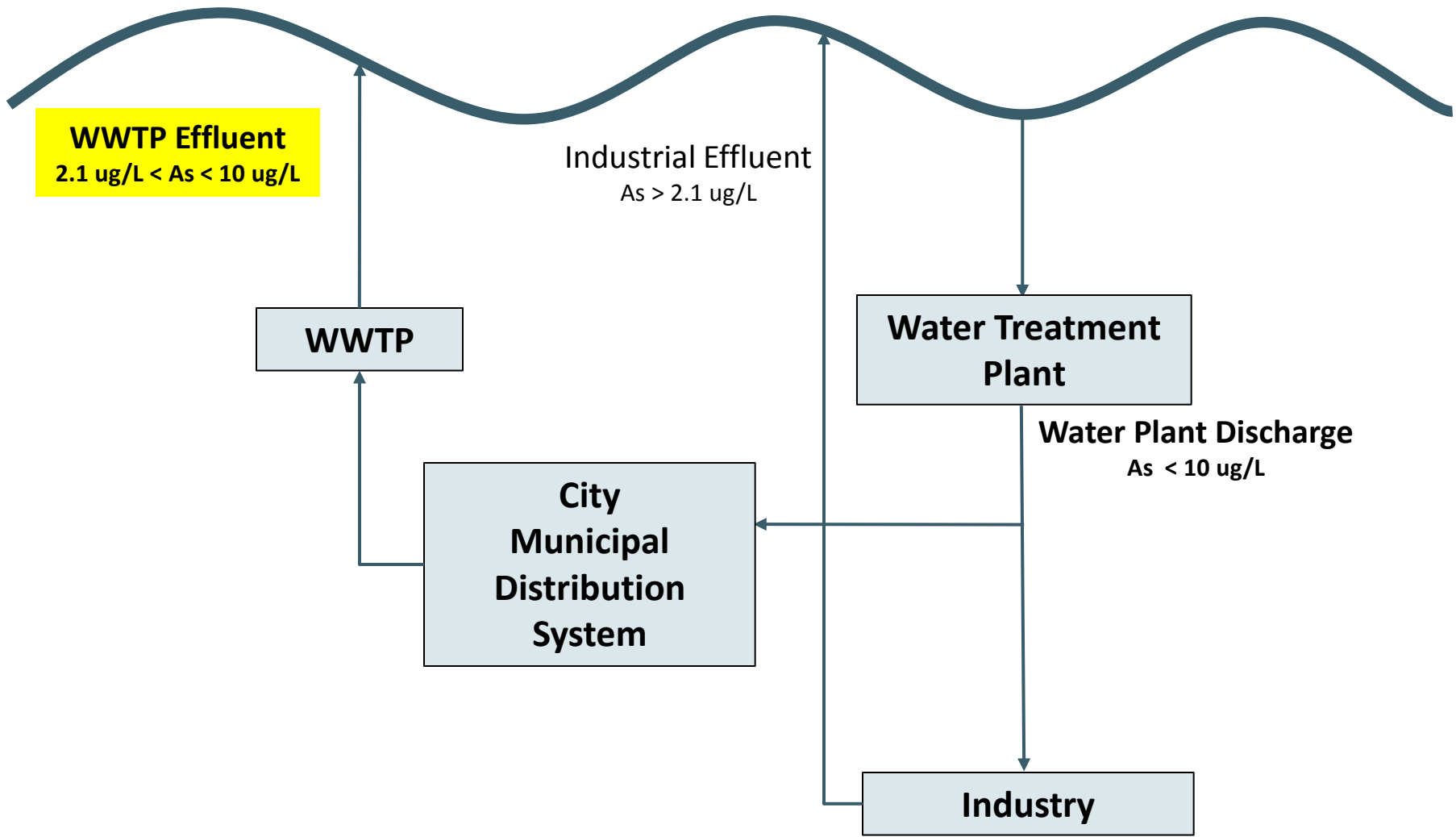
•Summer Land Application Results in Net Arsenic Reduction to River

River Discharge

As Criteria 2.1 ug/L

River Source of Supply

2.1 ug/L < As < 10 ug/L



• Winter Season Surface Water Discharge May Exceed Water Quality Standard

Conclusions and Recommendations