Workshop on PCB Variances for Spokane River Dischargers

November 14, 2019
9:00 a.m. – 3:30 p.m.
CenterPlace Regional Events Center
Spokane Valley, WA

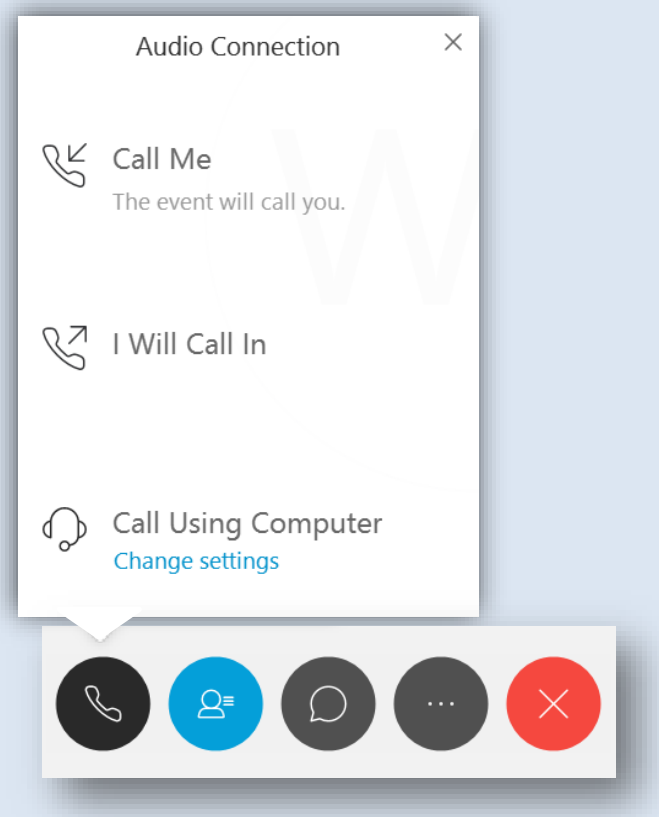
DEPARTMENT OF ECOLOGY
State of Washington

Variance Workshop WebEx Help

Connecting to Audio:

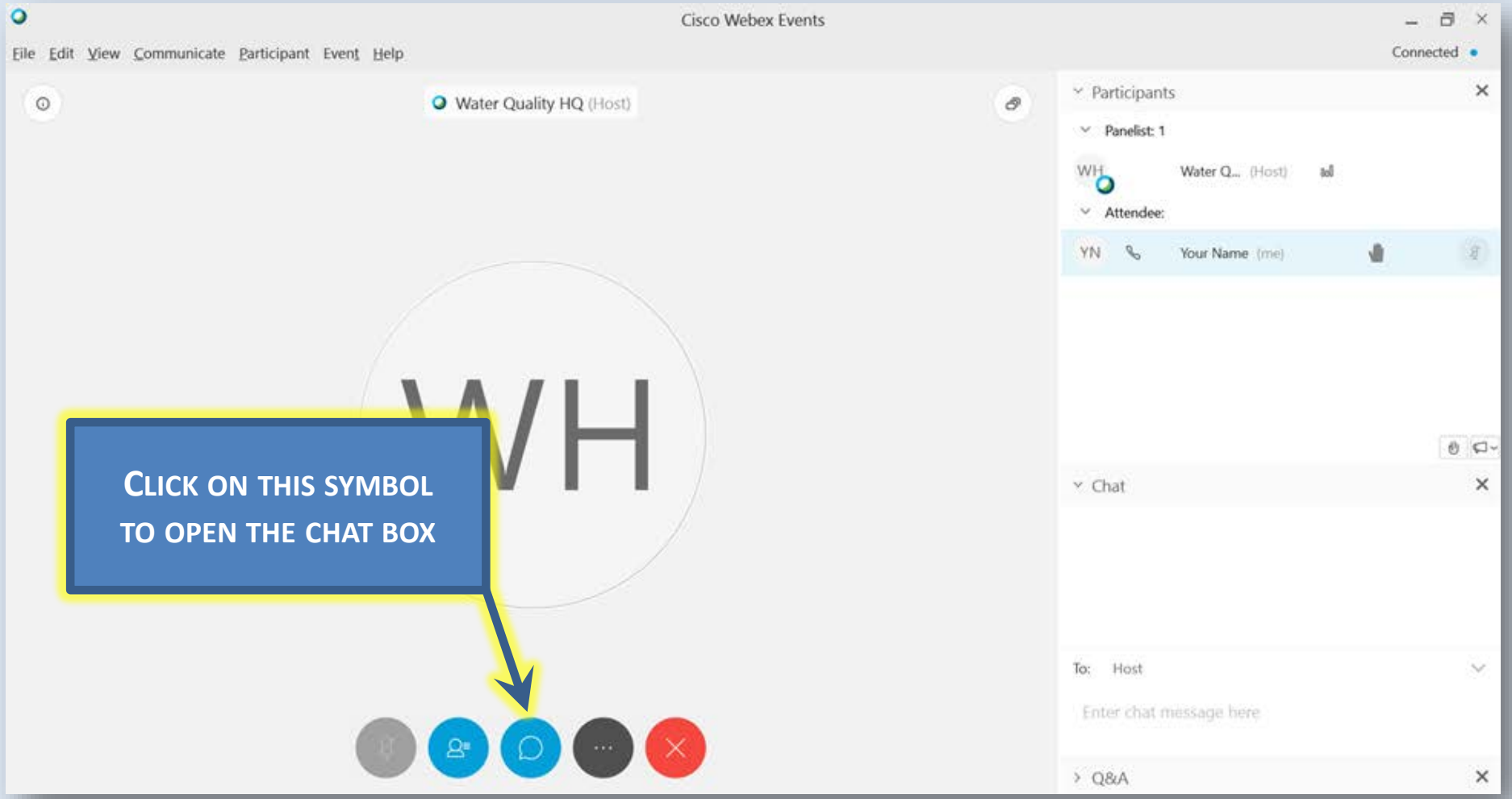
- After joining the webinar, look for the ‘Audio Connection’ pop-up.
- Select the ‘Call Me’ option (best audio quality)
- The webinar will call your phone

We will do a sound check 10 and 5 minutes before the scheduled start of the webinar.

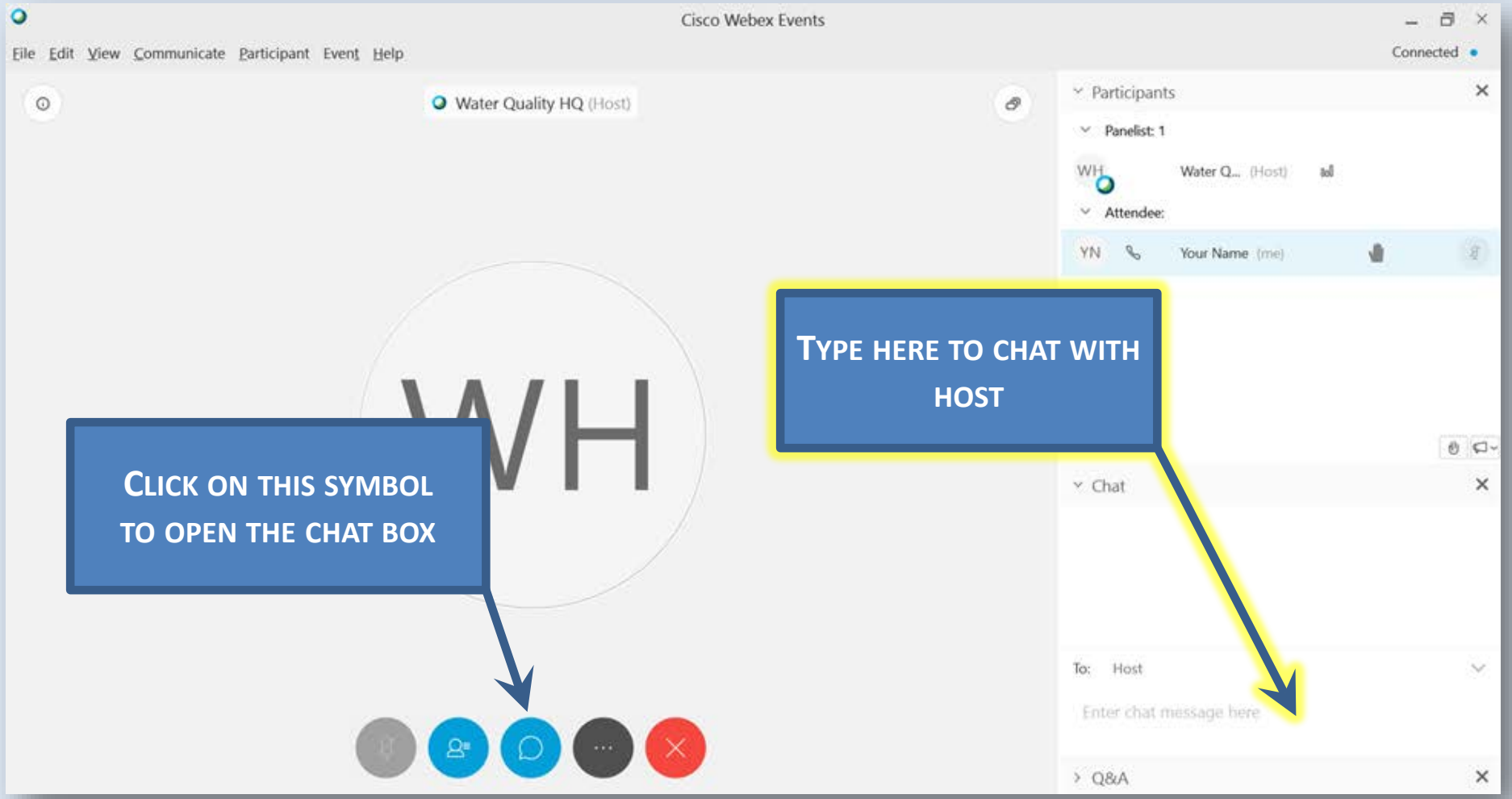


Having technical difficulties? Let us know via the chat box, or email robyn.dunlap@ecy.wa.gov.

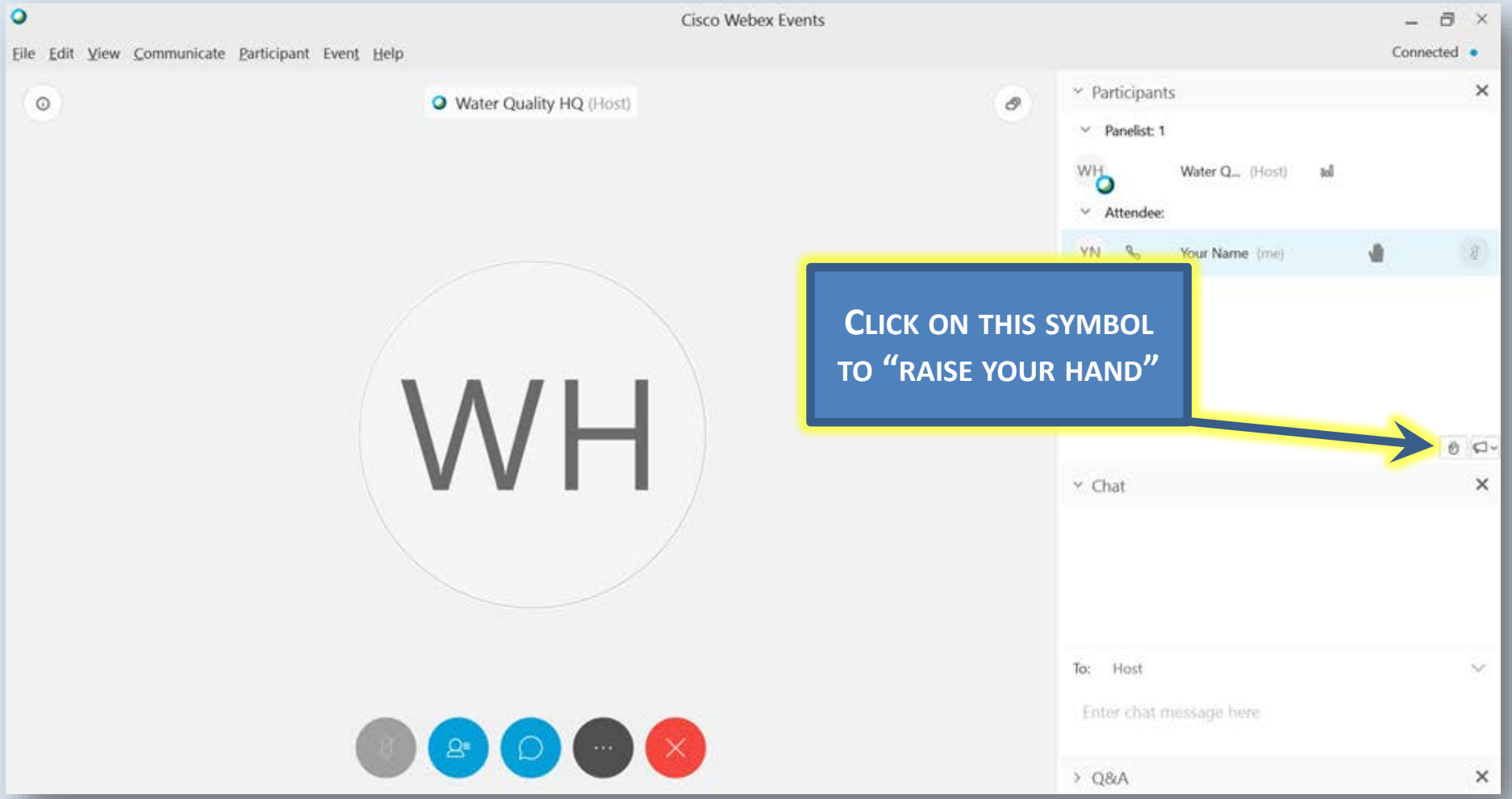
Webinar Features: Chat Box



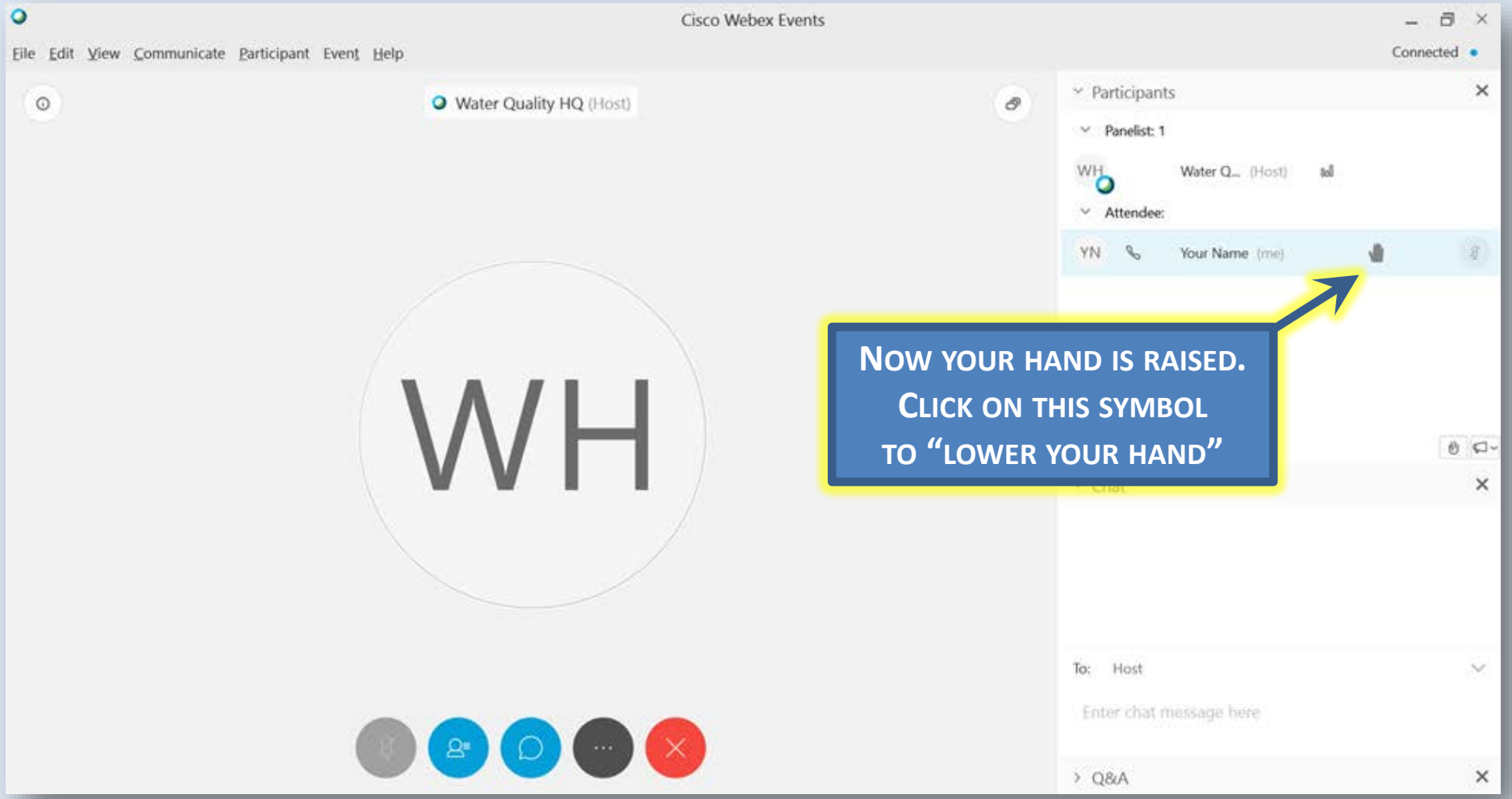
Navigating the Webinar Features



Navigating the Webinar Features



Navigating the Webinar Features



Workshop on PCB Variances for Spokane River Dischargers

November 14, 2019
9:00 a.m. – 3:30 p.m.
CenterPlace Regional Events Center
Spokane Valley, WA

DEPARTMENT OF ECOLOGY
State of Washington

Spokane Discharger PCBs Variances:

Context and Background

By
Cheryl Niemi, Water Quality Program
Washington Department of Ecology

Workshop on Spokane River PCB discharger variances
November 14, 2019
Spokane, WA

Contact Cheryl Niemi at
360-407-6440
Cheryl.niemi@ecy.wa.gov

DEPARTMENT OF ECOLOGY
State of Washington

This presentation will discuss:

- Washington's Surface Water Quality Standards (WQS)
- PCBs in the Spokane River
- Variances
- Status of the variance application reviews
- PCB sources

What are Water Quality Standards?

Water quality standards (WQS) are state, tribal, and federal regulations.

Purpose: WQS are to protect public health and welfare, enhance the quality of the water, and serve the purposes of the Clean Water Act. (See 40 CFR 131.2)

For example, WQS protect fishable and swimmable uses

https://pixabay.com/en/boy-fishing-water-summer-overalls-909552/

WQS are composed of three main parts

- **Designated uses** – include aquatic life, domestic water supply, recreation, **harvest**, etc.
- **Water Quality Criteria** – levels of water quality that fully protect the uses
  - **Numeric** and narrative criteria
- **Antidegradation Requirements** – ensures uses are maintained and protected, and that waters are not degraded unless necessary and in the over-riding public interest (WAC 173-201A-300).

Also: Other policies affecting application and implementation (e.g., mixing zones and downstream protection requirements)

Water Quality Standards for Surface Waters of the State of Washington. Chapter 173-201A WAC. https://apps.leg.wa.gov/WAC/default.aspx?cite=173-201a

WQS and permit limits

WQS are the foundation of state and tribal water quality-based pollution control programs under the Clean Water Act.

National Pollutant Discharge Elimination System (NPDES) water quality-based effluent limits are placed in permits when there is a reasonable potential to exceed the WQS.

PCB criteria that apply to the Spokane River

- WQ criteria for toxic pollutants are, in most cases, very low concentrations
- Usually expressed in the parts per billion range, aka “ppb.”

Washington’s Freshwater Criteria for PCBs

Criterion type	Parts per billion (ppb)	Basis
Human health criteria (HHC)	**0.000007** (= 7 parts per quadrillion)	**Fish ingestion by people** drives the calculation
Aquatic life criteria	**2.0** **0.014**	**Fish health** drives the calculation

- Downstream Spokane Tribe HHC for PCBs is **1.3 ppq**.

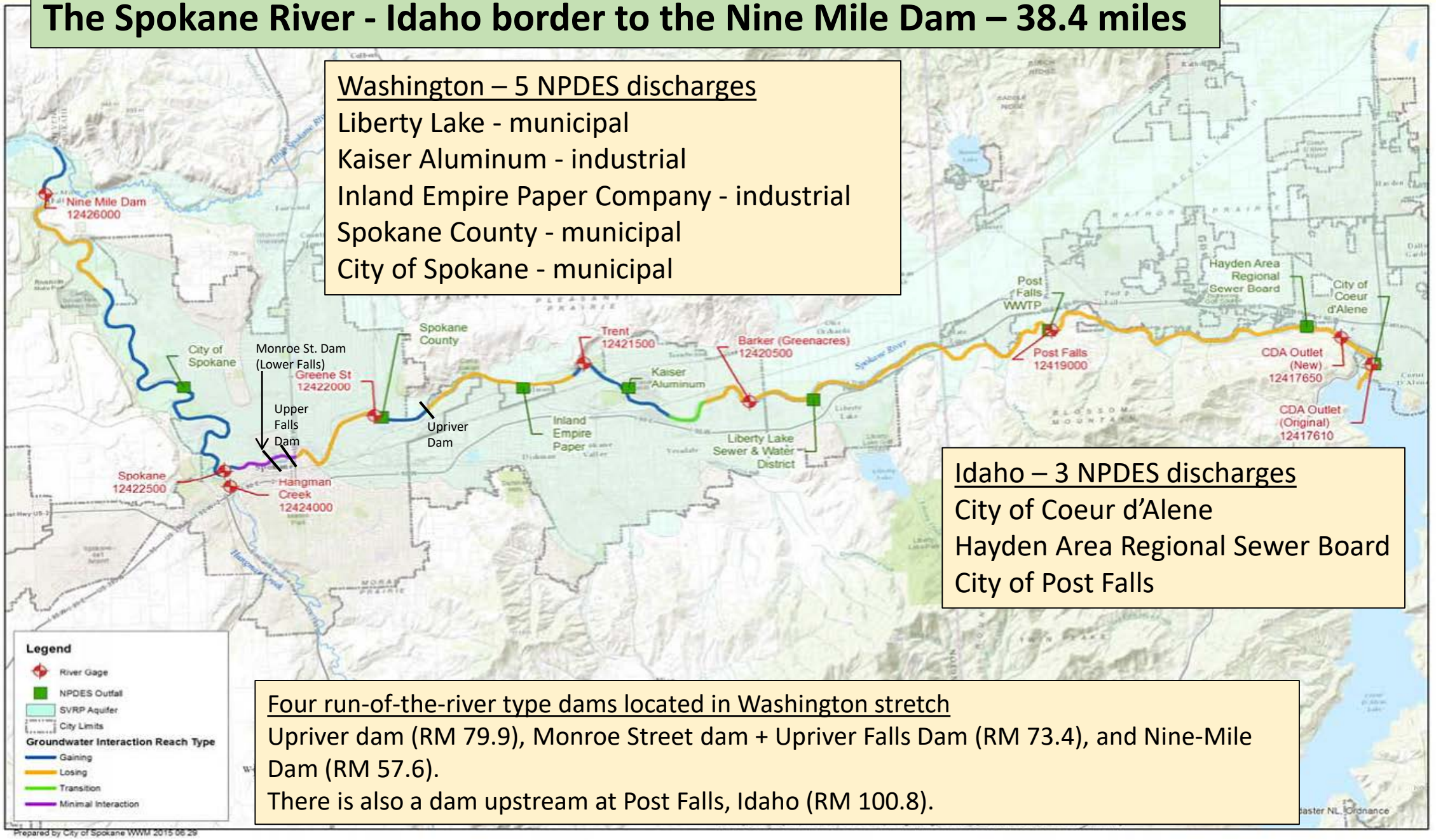
How small is small?

Common analogies:

One part per billion (ppb): One sheet in a roll of toilet paper stretching from New York to London

One part per quadrillion (ppq): One postage stamp on an area the size of California and Oregon

The Spokane River - Idaho border to the Nine Mile Dam – 38.4 miles



<u>Washington – 5 NPDES discharges</u>
Liberty Lake - municipal
Kaiser Aluminum - industrial
Inland Empire Paper Company - industrial
Spokane County - municipal
City of Spokane - municipal

<u>Idaho – 3 NPDES discharges</u>
City of Coeur d'Alene
Hayden Area Regional Sewer Board
City of Post Falls

<u>Four run-of-the-river type dams located in Washington stretch</u>
Upriver dam (RM 79.9), Monroe Street dam + Upriver Falls Dam (RM 73.4), and Nine-Mile Dam (RM 57.6).
There is also a dam upstream at Post Falls, Idaho (RM 100.8).

PCB criterion = 7 ppq

What we see in the river

Elevated PCB concentrations in water

Elevated PCB concentrations in fish tissue - high enough to prompt fish advisories

The Spokane River is CWA 303(d) listed as impaired by PCBs.

What does the Spokane River 303(d) listing mean for permits?

No more assimilative capacity for PCBs in the river – concentrations are already too high.

NPDES permit limits based on the 7 ppq criterion would be 7 ppq.

Ecology is considering **variances** – **a new *interim* WQS** – as a tool to reduce PCBs entering the river.

- Ecology received 5 variance applications in April 2019.
- Ecology filed a notice of intent to start a variance rulemaking on June 12 2019.

With a variance the permit limit would be based on the Highest Attainable Condition and would require continued reductions in PCBs over time.

What is a Variance?

Definitions:
173-01A-020: "Variance" is a **time-limited designated use and criterion** as defined in 40 C.F.R. 131.3, and must be adopted by rule.

40 CFR 131.3 (o): A water quality standards variance (WQS variance) is a **time-limited designated use and criterion** for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition during the term of the WQS variance.

In more direct terms:
A WQS variance is a path to improve water quality over time.

Regulations on variances:
- 40 CFR 131.14
- WAC 173-201A-420

A variance:

- Is a change to the WQ Standards that requires rule-making and EPA review and approval.
- Contains enforceable conditions that are placed in permits, including development and implementation of a Pollution Prevention Plan.
- Is always focused on meeting WQS by working toward the highest attainable condition.
- Includes a 5-year re-evaluation. This can result in additional requirements, and if the requirements of the variance are not being met then the variance can be removed.

A WQS variance is a path to improve water quality over time.

Variance Terminology:

The Highest Attainable Condition is a key requirement of a variance

- The core concept of a variance, whether we are addressing a discharger or a waterbody variance, is that the **highest attainable condition (HAC)** must be maintained throughout the term of the variance.
- The EPA structure for variances is built on the concept of the HAC, which determines the type of variance that is most appropriate for the situation.
- The development and determination of the HAC is critical to a variance -**we just can't get there without it.**

There are 3 paths to a discharger variance

HAC	HAC Requirements	Applicant
Path 1: The highest attainable **interim criterion** = HAC.	Requires estimation of the highest attainable ambient water quality	None
Path 2: The **interim effluent condition** that reflects the **greatest pollutant reduction achievable** = HAC.	Requires knowledge of the best quality effluent that is achievable. When that quality is achieved the variance ends.	Kaiser (requested duration: 13 years, 2 mo.)
Path 3: If no additional feasible pollutant control technology can be identified, the interim criterion or **interim effluent condition** that reflects the **greatest pollutant reduction achievable with the pollutant control technologies installed at the time** the State adopts the WQS variance, and the adoption and implementation of a Pollutant Minimization Program.	Requires installation of **feasible control technologies.** The HAC is expressed as the best ambient water quality condition, or the **best effluent condition, once the feasible control technology is installed.** Technology must be installed or guaranteed at the time the variance is granted. A **PMP** is required, and it is the continued implementation of the PMP that allows the **duration** of the variance to extend beyond the time of installation of the technology.	City of Spokane Spokane County Inland Empire Paper Liberty Lake (requested durations: 20 years)

Requesting a Variance – 2 parts

Part 1. Request Form.

Part 2. Information Submittal. As specified in the table below:

1. The criteria and designated use(s) proposed to be modified by the variance, and the proposed duration of the variance.
2. A demonstration that attaining the water quality standard is not feasible for the requested duration of the variance based on 40 C.F.R. 131.14.
3. An evaluation of treatment or alternative actions that were considered to meet effluent limits based on the underlying water quality criteria, and a description of why these options are not technically, economically, or otherwise feasible.
4. Sufficient water quality data and analyses to characterize receiving and discharge water pollutant concentrations.
5. A description and schedule of actions that the discharger(s) proposes to ensure the HAC is attained within the variance period.
6. Dischargers are also required to submit a schedule for development and implementation of a pollutant minimization plan for the subject pollutant(s).

See WAC 173-201A-420(3)

The nuts and bolts of developing a variance

1. Application received by Ecology.
2. Ecology reviews for completeness.
3. Decision to enter formal rulemaking

5 variance applications were received from Spokane River dischargers and were found to be complete.

→ If yes – then a public process begins.

4. Ecology develops the variance and its requirements using information from the application, as well as other information, and follows the requirements in the Washington Administrative Procedures Act. This is a public rulemaking process.

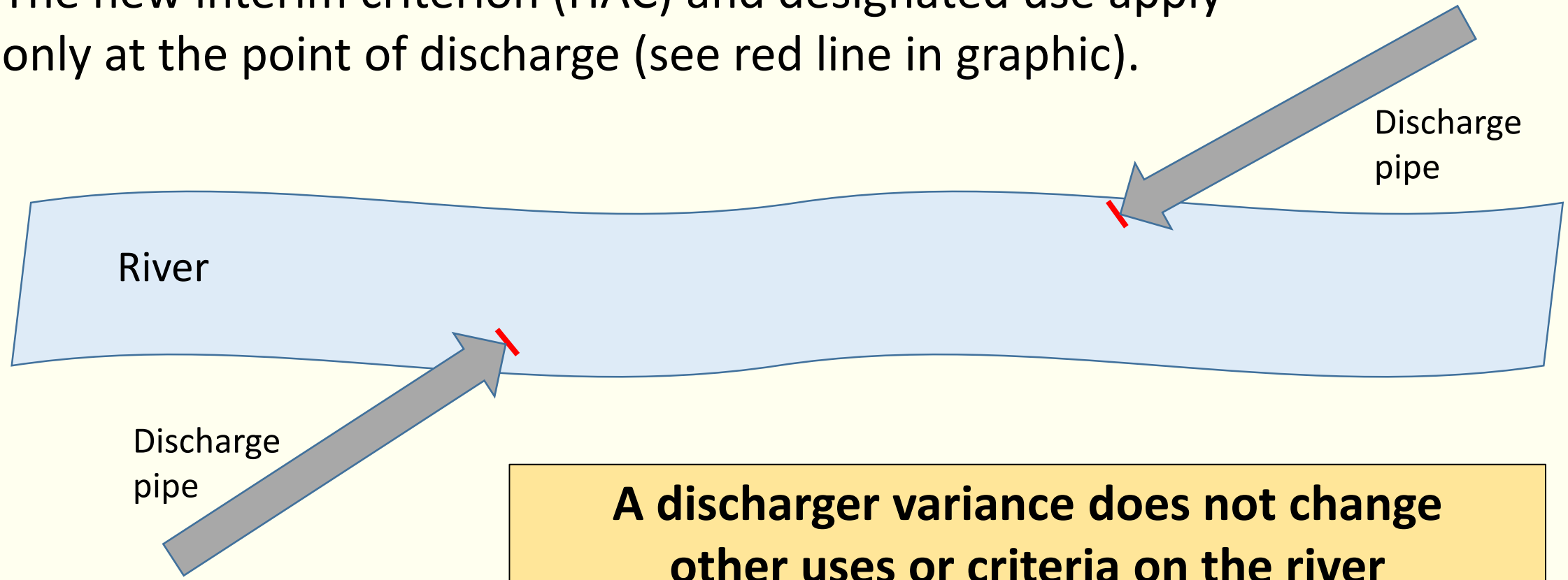
5. If a variance is finalized it must be submitted to the USEPA for Clean Water Act review and approval before it can be used.

A variance is an Ecology WQS developed through a public process and does not necessarily mirror the information in the original submittal.

A discharger variance applies at the end of the pipe

A discharger variance does **not** apply to the entire river.

The new interim criterion (HAC) and designated use apply only at the point of discharge (see red line in graphic).



A discharger variance does not change other uses or criteria on the river

How would a TMDL for PCBs affect permit limits based on a variance?

EPA regulations specify that **variances are the new standard for NPDES permits** and 401 certifications (40 CFR 131.14(a)(3)).

- A discharger variance is the basis of the NPDES permit limits for the subject parameter.

Variances **do not apply** to Water Quality Assessment or to TMDLs.

- The underlying water quality standard remains the basis for TMDLs and Water Quality Assessment

It does not matter if a TMDL is conducted and approved before the variance is issued, or while the variance is in effect, as long as the variance is still justified the variance replaces the standard for purposes of NPDES permitting.

How compliance with PCB permit limits is evaluated

NPDES numeric effluent limits are assessed using EPA-required methods.

Federal regulations require the use of specific laboratory methods for assessing compliance with NPDES permit limits (see 40 CFR 136).

EPA Method 608 is the analytical method used to assess compliance with Total PCBs effluent limits.

Example Total PCBs effluent limit (ppq)	Quantitation level of EPA-required method (ppq)	Concentration at which compliance is assessed (ppq)
7	50,000	50,000
200	50,000	50,000
1000	50,000	50,000
10,000	50,000	50,000

Why the focus on variances?

- Rulemaking provides a structured, transparent and comprehensive process that follows the Washington Administrative Procedures Act.
- WQS changes include statewide participation – this is a broad public process with extensive public participation.
- The variance, with its requirements, are adopted into the WQS.
- WQS changes must be reviewed and approved by the USEPA.

A variance provides a predictable path forward for the public and the regulated entity.

Ensuring progress towards meeting the PCB standard of 7 ppq

Variances are adopted into regulation and implemented in permits.

Enforceability:

- Permit conditions to reduce pollution

Accountability:

- 5-year public evaluations to review compliance with permit conditions and to **tighten down requirements** as progress is made.
- Variances can be shortened or terminated.
- Variances **cannot be made more "lenient"** based on the 5-year evaluations

The goal is to reduce PCBs and meet the underlying standard of 7 ppq.

PCBs enter the river from many sources

- Atmospheric deposition onto the land and water
- PCBs in stormwater - many sources
- PCB clean-up sites
- PCBs in industrial and municipal wastewater treatment plant effluent

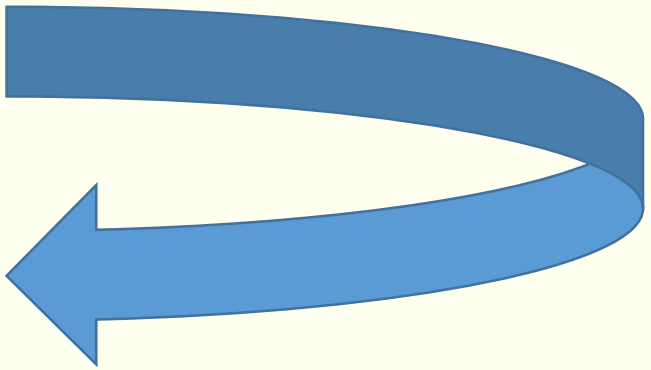
PCBs are entering the river and causing exceedances of the WQS for PCBs.

Focus – PCBs in products

Sometimes PCBs are inadvertently created when products are manufactured.

The Toxics Substances Control Act regulates PCBs in products at **50 parts per million.**

How do PCBs in products that comply with TSCA become CWA problems here in Washington?



…let's circle back to the PCB water quality standards.

Regulatory/guidance levels for total PCBs	Total PCBs (ppq)	Total PCBs (ppb)	Total PCBs (ppm)
Human health water quality criterion (40 CFR 131.45)	★ **7**	0.000007	0. 00000007
Aquatic life-based water quality criteria (WAC 173-201A)	2,000,000 14,000	★ **2.0** **0.014**	0.002 0.000014

The PCB criteria are set at very low concentrations

Regulatory/guidance levels for total PCBs	Total PCBs (ppq)	Total PCBs (ppb)	Total PCBs (ppm)
Human health water quality criterion (40 CFR 131.45)	★ **7**	0.000007	0. 00000007
Aquatic life-based water quality criteria (WAC 173-201A)	2,000,000 14,000	★ **2.0** **0.014**	0.002 0.000014
TSCA regulatory level for PCBs in products	**50,000,000,000**	50,000	★ **50**

★ We usually refer to the PCB criteria and the TSCA level in different units of concentration.

Product testing is usually reported in ppb's

Regulatory/guidance levels for total PCBs	Total PCBs (ppq)	Total PCBs (ppb)	Total PCBs (ppm)	Reference
Human health water quality criterion (40 CFR 131.45)	★ **7**	0.000007	0. 00000007	40 CFR 131.45
TSCA regulatory level for PCBs in products	**50,000,000,000**	50,000	★ **50**	40 CFR 761.3
Product	**Total PCBs (ppq)**	**Total PCBs (ppb)**	**Total PCBs (ppm)**	**Reference**
5 motor oils and lubricants	623,000. – 2,375,000.	0.623 – 2.375	0.000623 – 0.002375	City of Spokane, 2015 https://static.spokanecity.org/documents/publicworks/wastewater/pcbs/pcbs-in-municipal-products-report-revised-2015-07-21.pdf
3 road de-icers	38,000. – 1,952,000.	0.038 – 1.952	0.000038 – 0.001952	
Regular unleaded gasoline	935,000	0.935	0.000935	
PVC pipe and 2 pipe repair materials	1,110,000. – 17,780,000.	1.110 – 17.78	0.001110 – 0.01778	
One hydroseed mix	2,509,000,000.	2,509	2.509	

Product testing is usually reported in ppb's

Regulatory/guidance levels for total PCBs	Total PCBs (ppq)	Total PCBs (ppb)	Total PCBs (ppm)	Reference
Human health water quality criterion (40 CFR 131.45)	★ **7**	0.000007	0. 00000007	40 CFR 131.45
TSCA regulatory level for PCBs in products	**50,000,000,000**	50,000	★ **50**	40 CFR 761.3
Product	**Total PCBs (ppq)**	**Total PCBs (ppb)**	**Total PCBs (ppm)**	**Reference**
One laundry detergent	174,000	0.174	0.000174	City of Spokane, 2015
One dish soap	83,000	0.083	0.000083	
Three toothpaste products	100,000-110,000	0.10-0.11	0.00010-0.00011	Ecology 2016 https://fortress.wa.gov/ecy/publications/documents/1604014.pdf (note: still undergoing data validation)
Five clothing samples	1,300,000 – 16,600,000	1.3 – 16.6	0.0013 – 0.0166	
11 cosmetic/body care products	100,000 – 7,800,000	0.1 – 7.8	0.0001 – 0.0078	
12 printed materials/newsprint	2,400,000 – 53,500,000	2.4 – 53.5	0.0024 – 0.0535	

PCBs aren’t just a problem from the past

Manufacturers are meeting the TSCA requirement, but we need even lower levels of PCBs in products to help meet WQS.

We all use products containing PCBs.

- Those PCBs contribute to the PCB load in the river and to sewage sludge

Consumers need choices that reduce PCBs entering the environment.

- Reduce PCBs, don’t shuffle them around.

Bottom line: Variances provide a path to reduce PCBs

- The best feasible wastewater technology is required.
- Pollutant Minimization Plans provide a multi-pronged approach to address PCB reductions (e.g., products, new technologies, education).
- We approach PMPs using adaptive management.

  Plan – Implement – Evaluate – Learn - Adapt

- We need to reduce PCBs entering the environment from current products.

The goal is to reduce PCBs entering the river and meet the water quality standards.

Rulemaking at Ecology

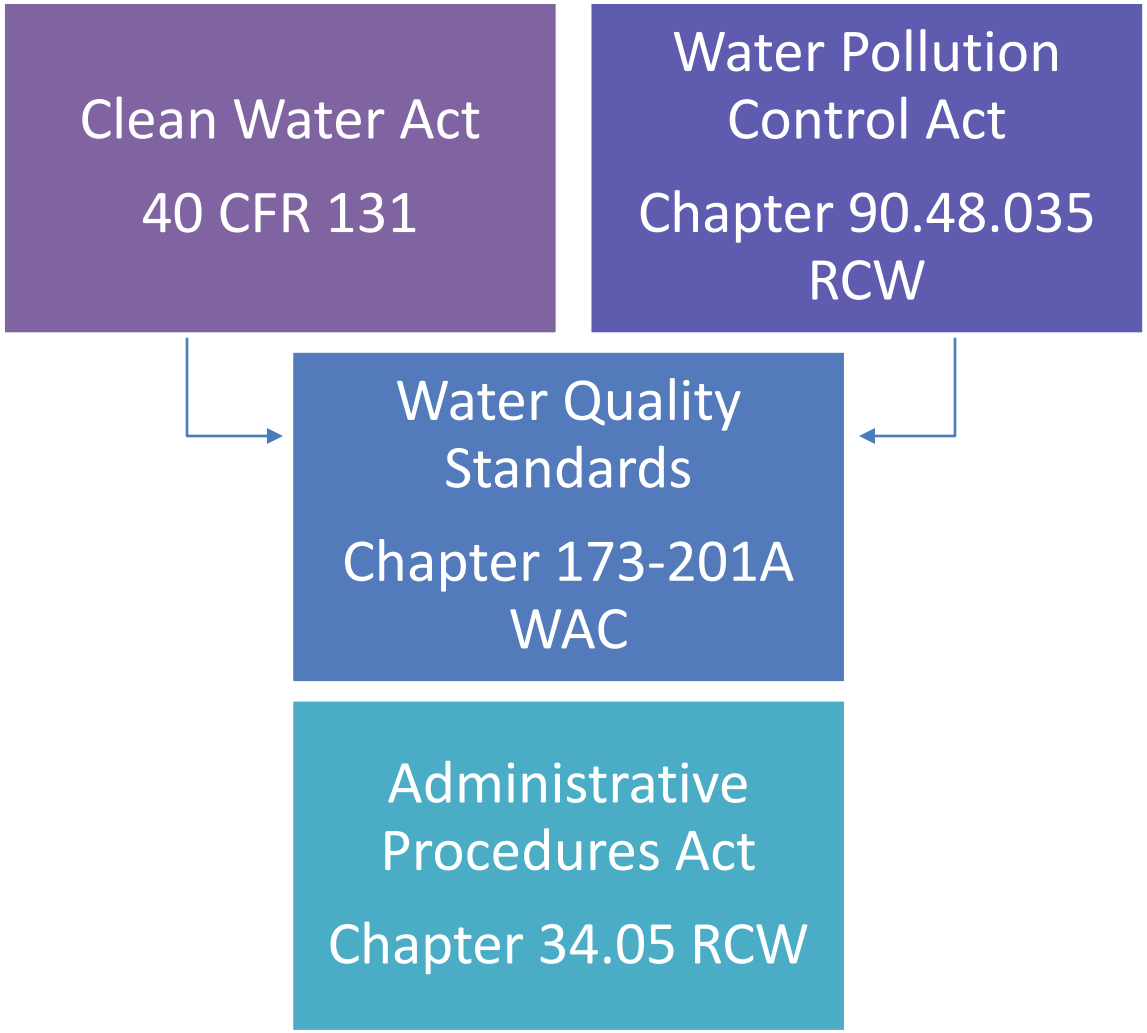
Marla Koberstein
Water Quality Program

What is rulemaking?

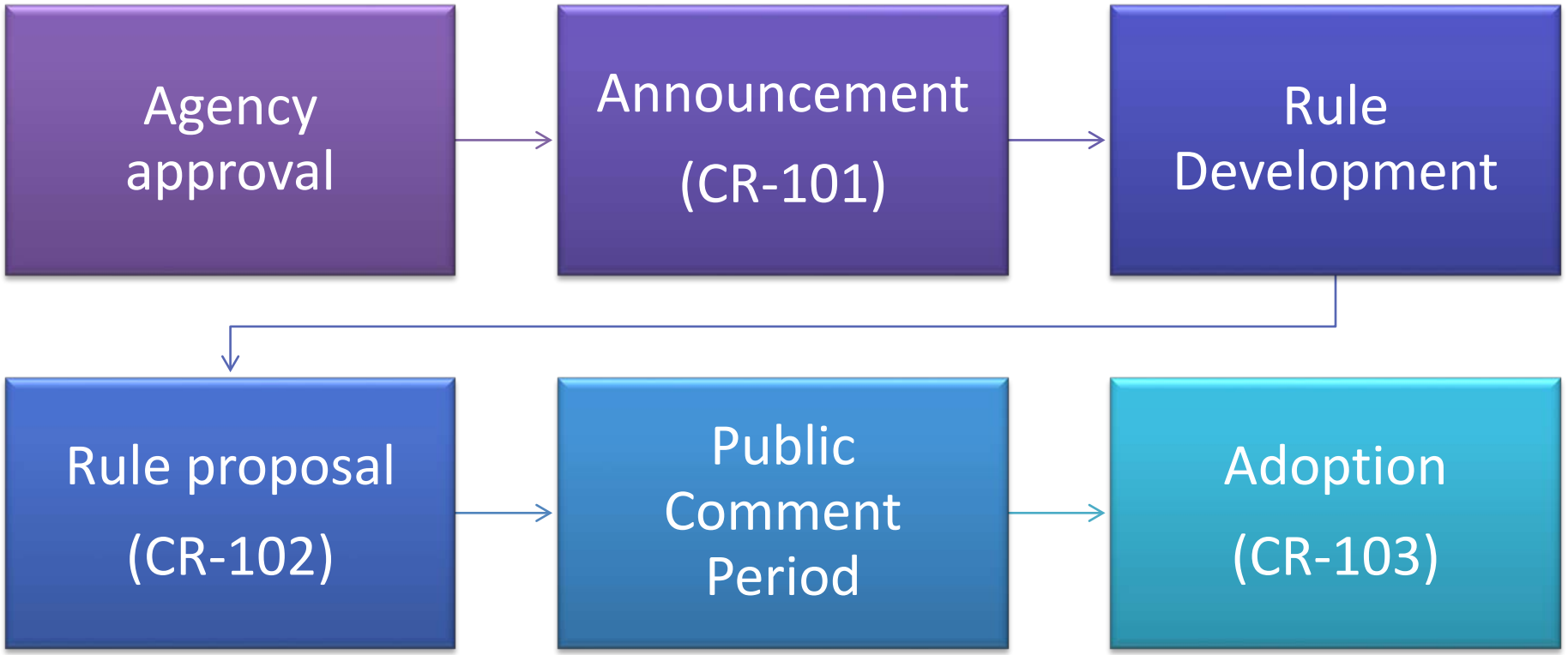
A public process to:

- Develop new rule language, or
- Amend/repeal existing rule language
- Implement state and federal laws and rules

Why are we doing a rulemaking?



Rulemaking Process



NOTE: EPA must approve the rule before use in Clean Water Act actions, such as NPDES permits

Announcement Phase (CR-101)

Purpose:

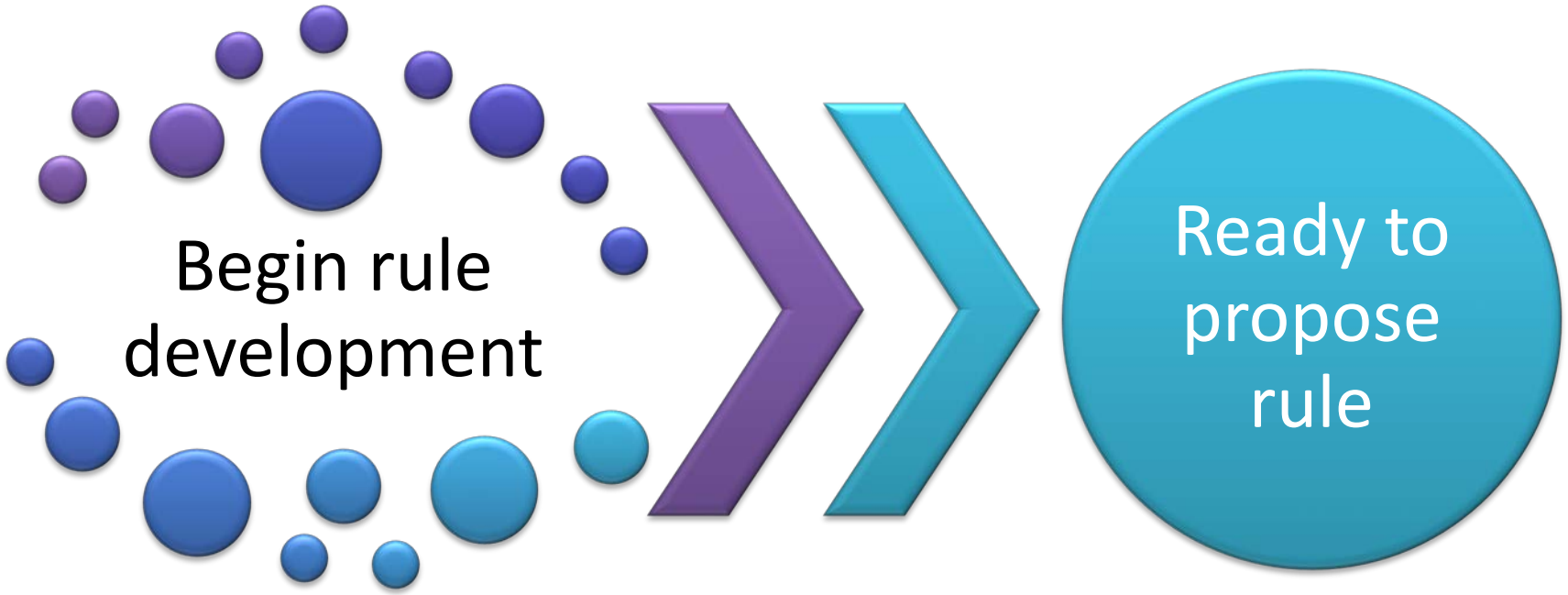
- Announce intent to adopt/amend/repeal a rule
- Invite public to participate in the full rulemaking process

The CR-101 filing provides:

- A brief description of the rulemaking
- Associated WAC number(s)
- Agency contact information

Rule Development Phase

- Engage tribes and stakeholders
- Perform other rule analyses
- Draft proposed language



Proposal Phase (CR-102)

Purpose:

- Issue the proposed rule, including
  - Proposed rule language
  - Draft SEPA documents
  - Draft regulatory analyses
- Open the formal comment period
- Publish in State Register

Comment Period

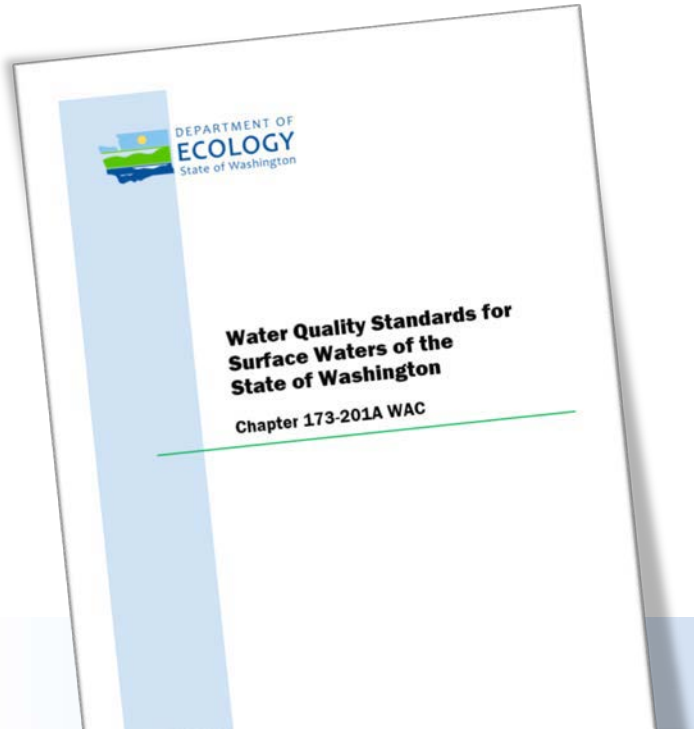
Ways to comment:

- Provide testimony at a public hearing
- Submit a comment in writing

Adoption Phase (CR-103)

Purpose:

- Adopt the final rule language
- Announce the adoption and effective date



Only the Ecology Director has the authority to adopt a rule.

EPA Approval for CWA Actions

Our rules are usually effective 31 days after adoption, but…

EPA reviews and approves the new standards before use in Clean Water Act actions, such as NPDES permits.

Rulemaking timeline

Public Comment Period

- Proposed rule language
- Preliminary Regulatory Analyses
- Draft Environmental Impact Statement
- Draft Rule Implementation Plan
- Draft Pollutant Minimization Plans
- Other supporting documents

Thank you

Marla Koberstein

Water Quality Standards Rules Coordinator

swqs@ecy.wa.gov 360-407-6413

Introduction to
Economic Analysis
at Ecology

Sam Wilson
Regulatory Analyst | Ecology Governmental Relations
sam.wilson@ecy.wa.gov | (360) 407-7476

DEPARTMENT OF ECOLOGY
State of Washington

Overview

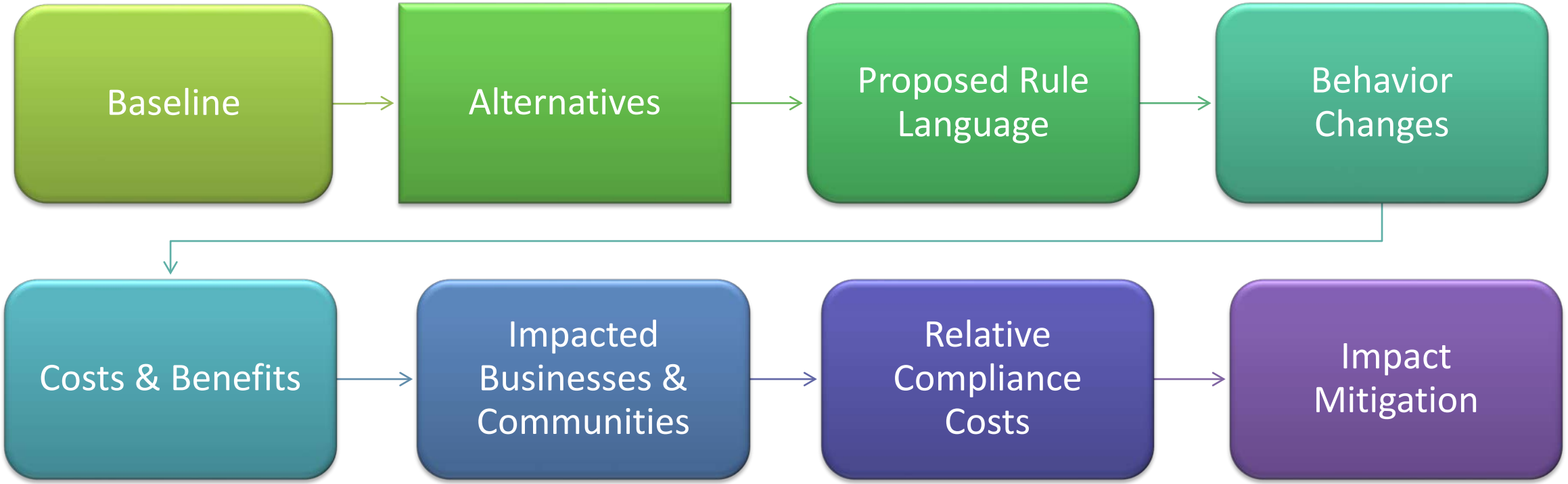
- Our economic analyses support:
  - Rules
  - General permits
  - Legislative reports and requests, Chemical Action Plans, etc.

- Our economic analyses rely on:
  - Real world quantitative data
  - Qualitative information
  - Comprehensive regional economic models
  - Rigorous methods

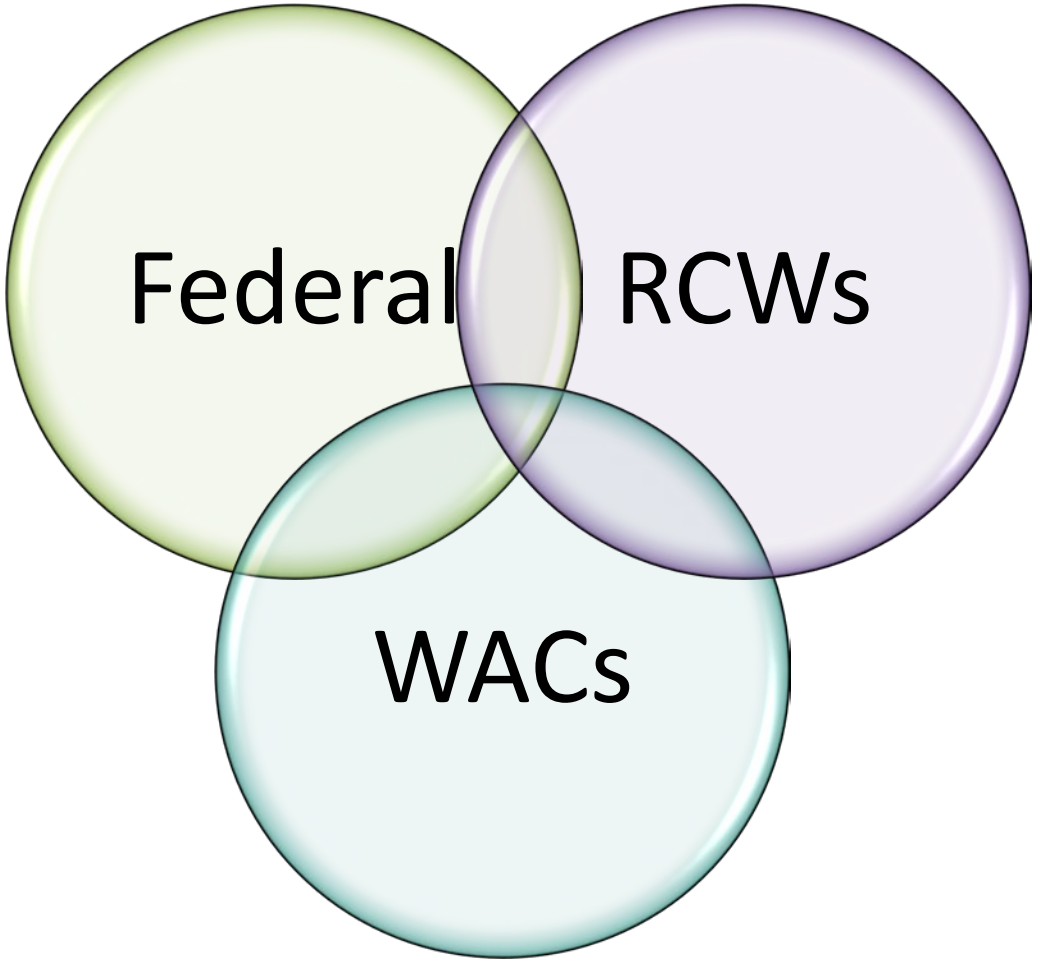
Economic analyses during rulemaking

Proposal Phase (CR-102)	• **Preliminary Regulatory Analyses** document published with Proposed Rule Language
Comment Period	• Comments on Preliminary Regulatory Analyses accepted with comments on rule language
Adoption Phase (CR-103)	• **Final Regulatory Analysis** document published with Final Rule Language • Response to economic comments in CES

Analysis


Baseline
Alternatives
Proposed Rule Language
Behavior Changes
Costs & Benefits
Impacted Businesses & Communities
Relative Compliance Costs
Impact Mitigation

Baseline & scope



- Regulations in early development/conception
- Non-required industry practice
- Selected agency interpretation

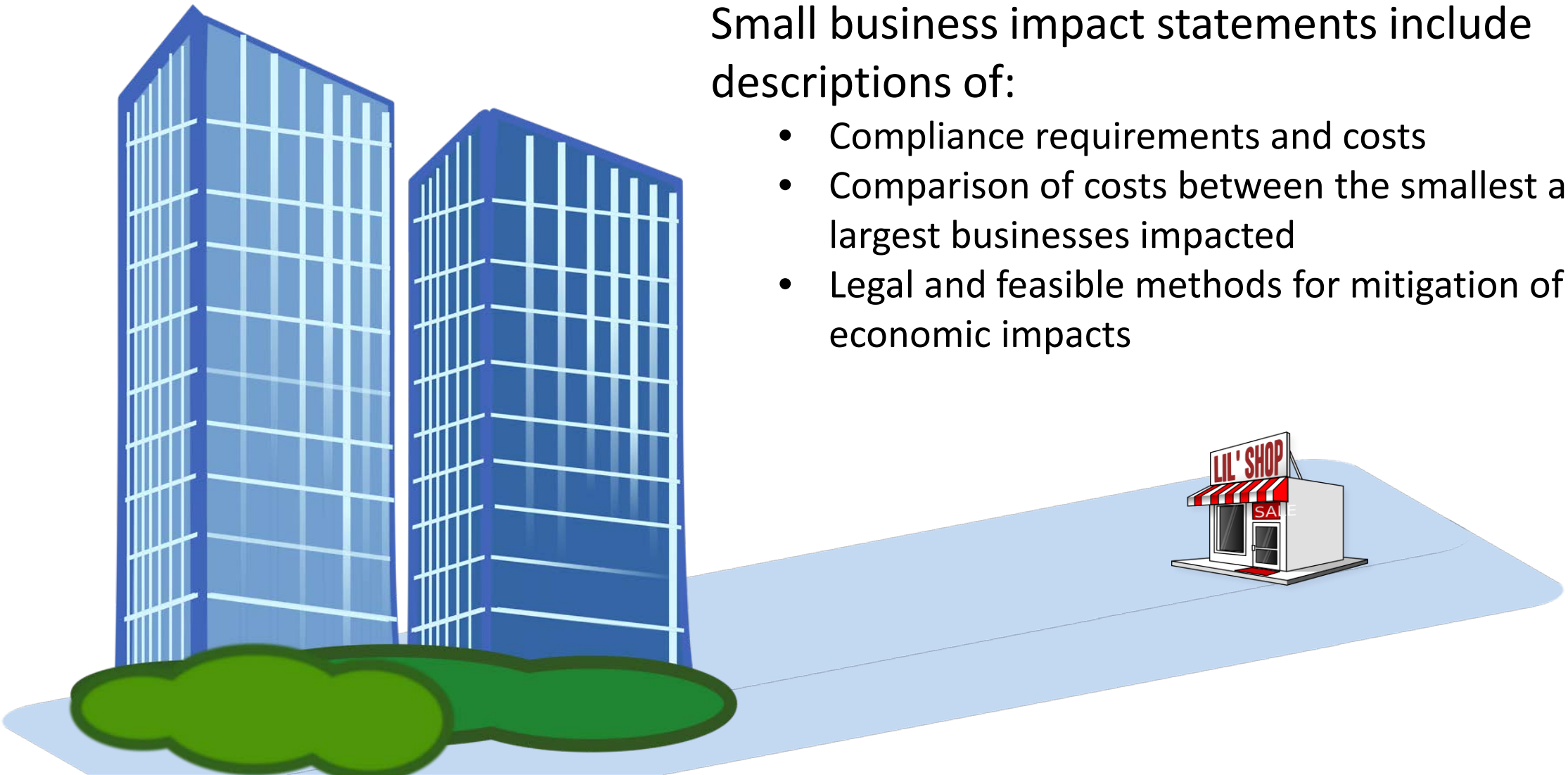
Costs & benefits

Value of impacts to:

- Cost of doing business
- Human health
- Environment, animals, and habitat
- Property

APA: Qualitative AND Quantitative

Small business impacts



Small business impact statements include descriptions of:

- Compliance requirements and costs
- Comparison of costs between the smallest and largest businesses impacted
- Legal and feasible methods for mitigation of economic impacts

Let's chat

- We may reach out to:
  - Ask for data on:
    - Baseline operating costs
    - Anticipated costs or benefits to your business or community
    - Potential qualitative impacts
  - Check assumptions on costs and benefits
  - Truth our modeling structure

Thank you

Sam Wilson

Regulatory Analyst | Governmental Relations

Washington State Department of Ecology

360.407.7476 | sam.wilson@ecy.wa.gov

Questions/Comments?

https://pixabay.com/en/question-question-mark-survey-2736480/

We will now take a 15 minute break

Spokane Discharger Variances: Overview of the application review process

By
Cheryl Niemi, Water Quality Program
Washington Department of Ecology

Workshop on Spokane River PCB discharger variances
November 14, 2019
Spokane, WA

Contact Cheryl Niemi at
360-407-6440
Cheryl.Niemi@ecy.wa.gov

DEPARTMENT OF ECOLOGY
State of Washington

The 2 discharger variance paths being evaluated

HAC	HAC Requirements	Applicant
Path 2: The interim effluent condition that reflects the greatest pollutant reduction achievable = HAC.	Requires knowledge of the **best quality effluent that is achievable.** When that quality is achieved the variance ends.	Kaiser
Path 3: If no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the State adopts the WQS variance, and the adoption and implementation of a Pollutant Minimization Program.	Requires installation of **feasible control technologies.** The HAC is expressed as the best ambient water quality condition, or the **best effluent condition, once the feasible control technology is installed**. Technology must be installed or guaranteed at the time the variance is granted. A **PMP** is required, and it is the continued implementation of the PMP that allows the **duration** of the variance to extend beyond the time of installation of the technology.	City of Spokane Spokane County Inland Empire Paper Liberty Lake

What a discharger must submit to Ecology to apply for a variance

Part 2. Information Submittal.

1. The criteria and designated use(s) proposed to be modified by the variance, and the proposed duration of the variance.
2. A demonstration that attaining the water quality standard is not feasible for the requested duration of the variance based on 40 C.F.R. 131.14.
3. An evaluation of treatment or alternative actions that were considered to meet effluent limits based on the underlying water quality criteria, and a description of why these options are not technically, economically, or otherwise feasible.
4. Sufficient water quality data and analyses to characterize receiving and discharge water pollutant concentrations.
5. A description and schedule of actions that the discharger(s) proposes to ensure the HAC is attained within the variance period.
6. Dischargers are also required to submit a schedule for development and implementation of a pollutant minimization plan for the subject pollutant(s).

See WAC 173-201A-420(3)

What the state must submit to EPA for a discharger variance

- Pollutant, water body, and permittee
- The Highest Attainable Condition (always with a PMP as per WA WQS)
- A statement providing that the requirements of the WQS variance are either the highest attainable condition identified at the time of the adoption of the WQS variance, or the highest attainable condition later identified during any reevaluation consistent with paragraph (b)(1)(v) of this section, whichever is more stringent.
- The duration – only as long as necessary to achieve the HAC
- A specific re-evaluation frequency, no greater than 5 years.
- A provision that the WQS variance will no longer be the applicable water quality standard for purposes of the Act if the State does not conduct a reevaluation consistent with the frequency specified in the WQS variance or the results are not submitted to EPA within 30 days of the reevaluation.

Ecology evaluation of the variance applications

Path 2: The interim effluent condition that reflects the greatest pollutant reduction achievable = HAC.

The best technology does not have to be currently in place. This path requires knowledge of the best quality effluent that is achievable. When that quality is achieved the variance ends.

Ecology evaluation includes:

- Technology analysis, alternative actions analysis
- Evaluation of the schedule of actions (e.g. construction and optimization of new technology) to reach the HAC.
- Development of a numeric that describes the greatest pollutant reduction achievable.
- PMP analysis (required by Ecology, not required under federal regulations).

Ecology evaluation of the variance applications

Path 3: If no additional feasible pollutant control technology can be identified, the … interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the State adopts the WQS variance, and the adoption and implementation of a Pollutant Minimization Program.

This path requires installation of feasible control technologies. The technology must be installed or guaranteed at the time the variance is granted. A PMP is also required.

Ecology evaluation includes:

- Technology and alternative actions analyses
- Development of a numeric (e.g. a percent reduction or a concentration) that describes the greatest pollutant reduction achievable.
- PMP analysis (required by Ecology, not required under federal regulations).

Ecology must demonstrate that the variance is justified.

EPA specifies 7 different factors that can be used to justify a variance.

For these 5 variance applications, the dischargers submitted justifications for **federal factors 3 and 6.**

40 CFR 131.10(g)**(3)** Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place. (all 6 dischargers)

40 CFR 131.10(g)**(6)** Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact. (City of Spokane only)

Variance Application Reviews
Treatment Technology

Pat Hallinan
Water Quality Program

Variance Application Requirement:

- WAC 173-201A-420(3)(c). An evaluation of treatment or alternative actions that were considered to meet effluent limits based on the underlying water quality criteria, and a description of why these options are not technically, economically, or otherwise feasible.

Sources of Information

VARIANCE APPLICATIONS:

- Brown and Caldwell (2019). *Application for Individual Discharger Variance.* Prepared for Spokane County, Brown and Caldwell, April 30, 2019
- City of Spokane (2019). *General Information Required for a Variance Request.* City of Spokane, April 29, 2019
- Inland Empire Paper Company (2019). *General Information Required for a Variance Request.* Inland Empire Paper Company, April 30, 2019
- Kaiser (2019). *Application for Variance.* Kaiser Aluminum Washington, LLC, Trentwood Works, April 29, 2019
- Liberty Lake Sewer and Water District (2019). *Water Quality Variance Request.* Liberty Lake Sewer and Water District, April 30, 2019

Sources of Information Cont.

OTHER LOCAL STUDIES/REPORTS:

- CDM (2002). *PCB Treatment Engineering Report, Kaiser Aluminum & Chemical Corporation Trentwood Works*. CDM, March 28, 2002
- CDM (2002). *Addendum to PCB Treatment Engineering Report, Kaiser Aluminum & Chemical Corporation Trentwood Works*. CDM, May 16, 2002
- Hart Crowser (2012). *Final Feasibility Study Technical Memorandum Kaiser Trentwood Facility, Spokane Valley, WA*. Hart Crowser, Inc., May 2012

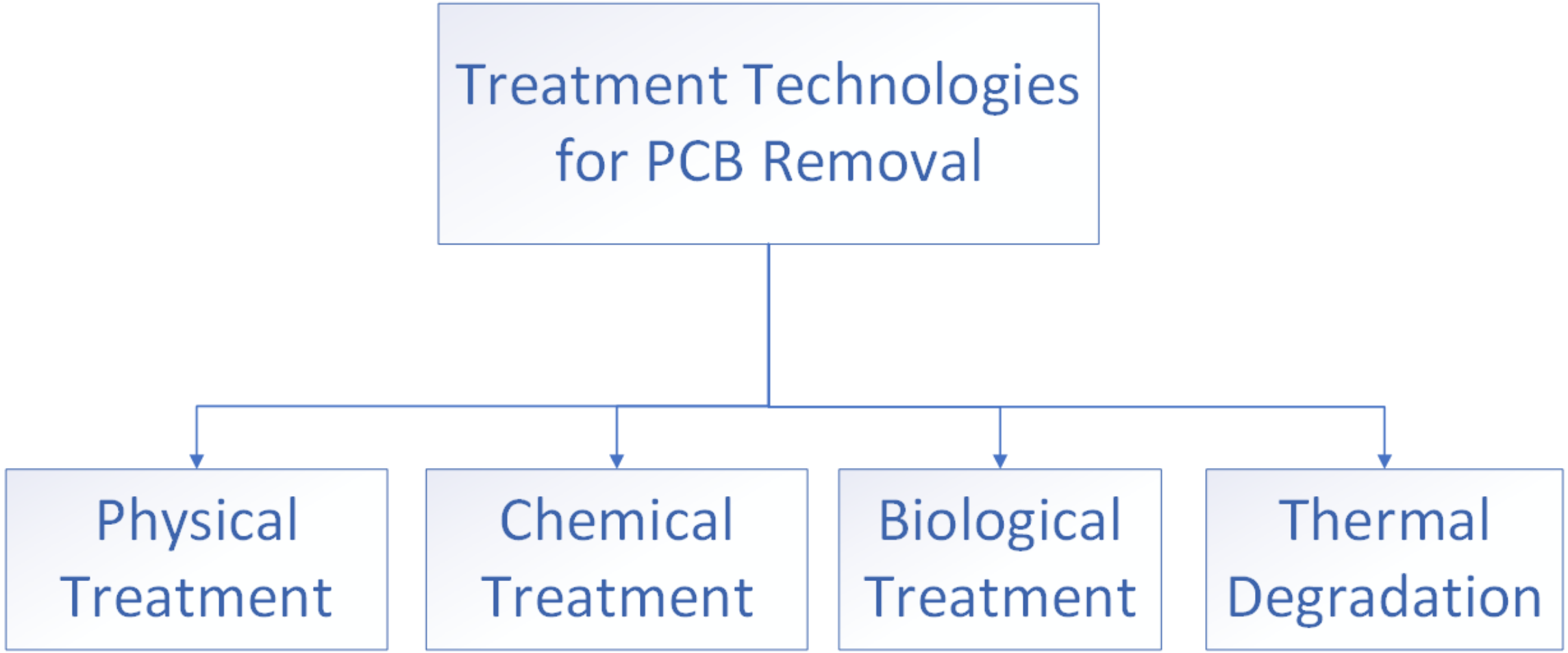
Sources of Information Cont.

OTHER STATE REPORTS:

- State of Virginia, Resources for Regulated Stakeholders: https://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/PCBTMDLs/ResourcesforRegulatedStakeholders.aspx
- Science Applications International Corporation (2005). Technological Feasibility of Proposed Water Quality Criteria for New Jersey, Prepared for USEPA Region 2, EPA Contract No. 68-C-99-252

LITERATURE REVIEW

Treatment Technologies

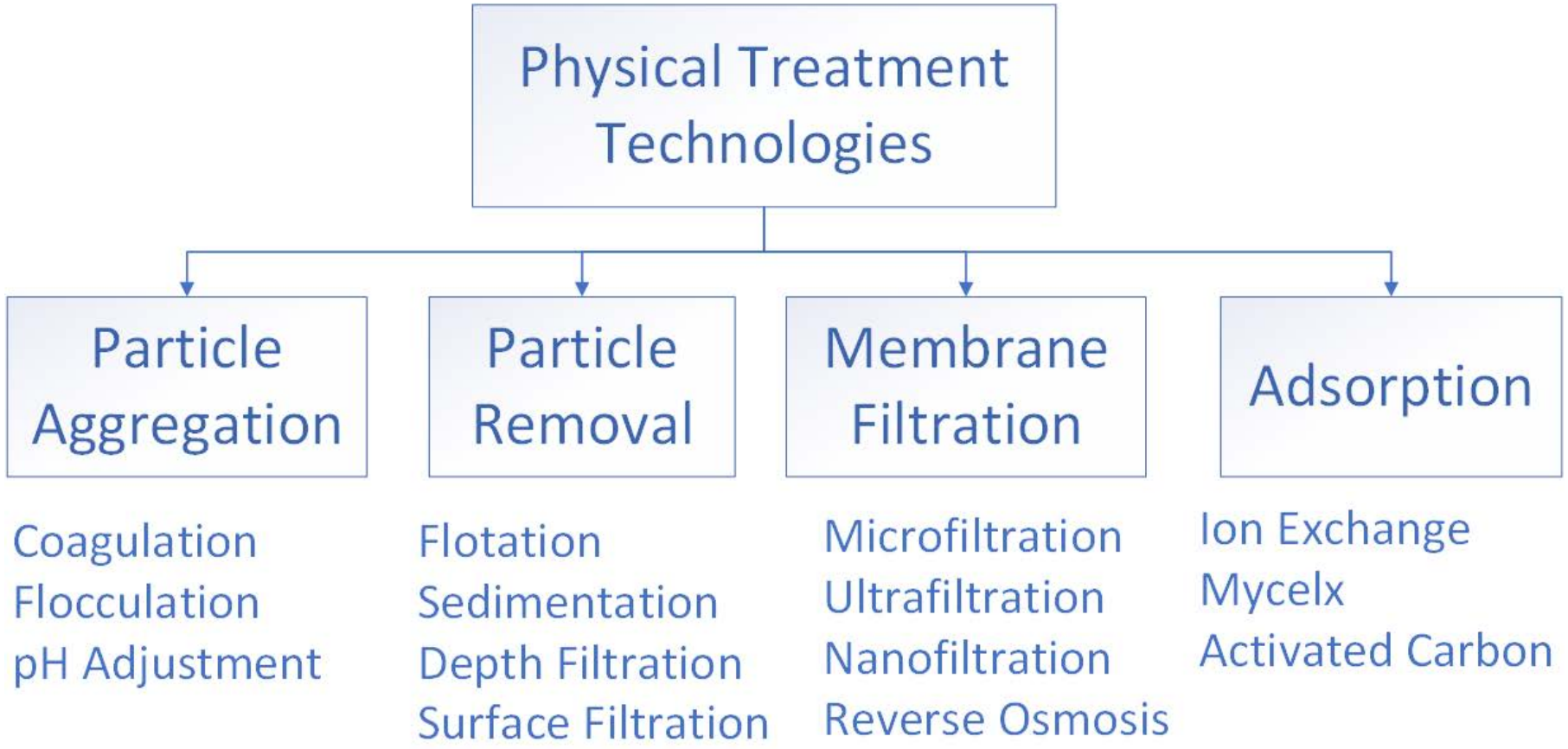


Physical Treatment

Physical mechanisms to remove pollutants

- PCBs are hydrophobic with low water solubilities
- PCBs will generally adhere to suspended solids, organic matter, and oils present in domestic and industrial wastewaters
- Most physical treatment processes that remove solids and oil & grease will also remove PCBs

Physical Treatment Technologies



Chemical Treatment

Chemical processes to degrade/destroy PCBs

- Dechlorination/Dehalogenation of PCB molecule that results in a biphenyl molecule
- Complete oxidation/mineralization of PCB molecules that produces carbon dioxide, water, and chlorides

Chemical Treatment Technologies

Super Critical Water Oxidation
Ultrasonic Radiation
Catalytic Hydro-Dehalogenation
Nano Scale Zero Valent Iron

Reagent Only:
Iron/H_2O_2
Iron/H_2O_2/Persulfate-Peroxymonosulfate
H_2O_2/Ozone
Electrochemical Peroxidation
Reagent + ultraviolet radiation (uv):
uv/H_2O_2
uv/Ozone
uv/H_2O_2/Ozone
uv/H_2O_2/TiO_2

Biological Treatment

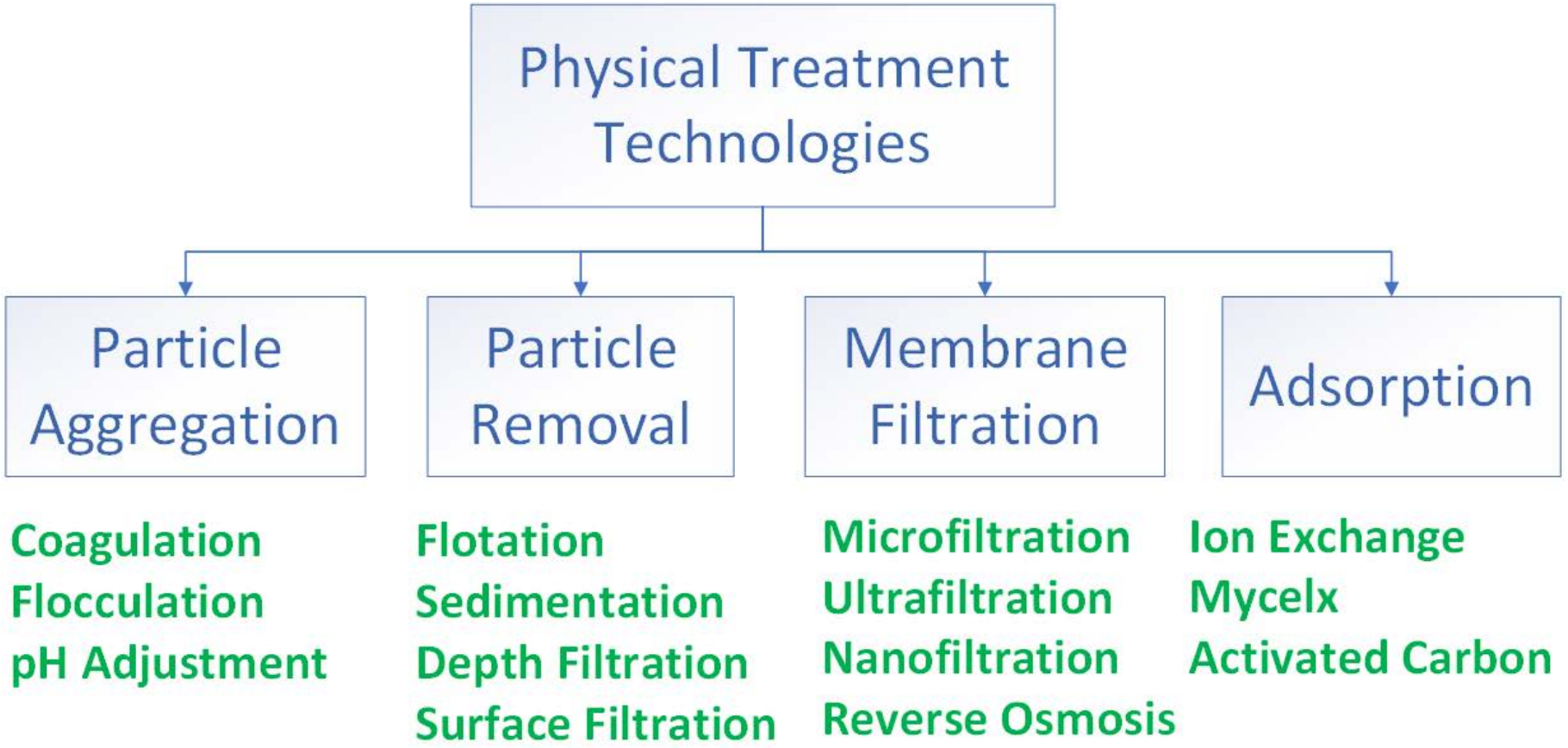
Biological Treatment Technologies

Conventional
Biological Activated Carbon
Phytoremediation

Ecology Review

- Technology installed/planned for facility?
- Environmentally feasible
  - –Does the technology have a major disadvantage?
- Will technology meet the underlying water quality criteria?
- Has technology been demonstrated at the range of flows discharged to the Spokane River?

Physical Treatment



Chemical Treatment

Super Critical Water Oxidation
Ultrasonic Radiation
Catalytic Hydro-Dehalogenation
Nano Scale Zero Valent Iron

Reagent Only:
Iron/H_2O_2
Iron/H_2O_2/Persulfate-Peroxymonosulfate
H_2O_2/Ozone
Electrochemical Peroxidation
Reagent + ultraviolet radiation (uv):
uv/H_2O_2
uv/Ozone
uv/H_2O_2/Ozone
uv/H_2O_2/TiO_2

Biological Treatment

Biological Treatment Technologies

Conventional
Biological Activated Carbon
Phytoremediation

Other Technologies for PCB Removal

Technology	Meet WQ Criteria?	Technology Drawback
Reverse Osmosis	No	Disposal of reject water Unknown/uncertain removal efficiencies
Activated Carbon	No	Unknown/uncertain removal efficiencies
Biological Activated Carbon	No	Unknown/uncertain removal efficiencies
Advanced Oxidation Process – *uv*/H_2O_2 or similar	No	Unknown/uncertain removal efficiencies

Advanced Oxidation Process Example (uv/H_2O_2)

- Implemented at Orange County Water District's Groundwater Replenishment System, 100 mgd water reclamation facility: https://www.ocwd.com/gwrs/about-gwrs/
- Destruction of 'target' organic compounds by hydroxyl radicals can be hindered by:
  - Other organics
  - Inorganic compounds (alkalinity & nitrite)
  - Excess H_2O_2
- Reaction rates decrease with decreasing concentrations

Alternative Actions Analysis

Diana Washington

Water Quality Program

DEPARTMENT OF ECOLOGY
State of Washington

Use of Alternatives Actions Evaluation in Variance Process

- Alternative action vs. treatment technology
- Action applicability
- Evaluation process

Development of Alternative Actions

- Goal to identify actions other than biological, physical and chemical treatment
- Actions remove the discharge from the water body either completely or seasonally.
- Actions identified by:
  - variance application packages
  - previously submitted facility planning documents
  - best professional judgement (BPJ)
  - public process

Alternative Actions Considered and Issues

- Regionalized treatment
  - Infrastructure
  - Agreements
  - Identify needed treatment alternatives
- Zero discharge
  - Large land requirement
  - Large energy requirement
- Reclaimed water
  - New permit
  - Identify uses for water
- Alternate discharge location
  - Land acquisition

Questions/Comments?

https://pixabay.com/en/question-question-mark-survey-2736480/

LUNCH BREAK

12:00 p.m. – 1:15 p.m.

Municipal Pollutant Minimization Plan

Diana Washington
Water Quality Program

DEPARTMENT OF ECOLOGY
State of Washington

Development of Pollutant Minimization Plans (PMP)

- Goals of PMP
- Benefit of PMP
- Identify actions/elements
  - Permittee identified actions
  - SRRTTF Comprehensive Plan
  - Public Comments

Example PMP Organization

- Objective
  - Source Identification
    - Actions
    - Schedule
    - Goals
  - Source mitigation
  - Public Education and Outreach
  - Reporting

EXAMPLE of Table Format

Example Objective: Source Identification			
Action	Action Type	Schedule	Goals
Identify add on technologies that may remove additional PCBs	Ongoing	Once during each permit cycle	Identify a technology that will help the discharger continue to reduce PCBs discharge to the Spokane River

PMP in the permit

- Implement the PMP in the permit
- Specific reporting
- Require adaptive management strategy

Pollutant Minimization Plans
Industrial Dischargers

Pat Hallinan
Water Quality Program

DEPARTMENT OF
ECOLOGY
State of Washington

Variance Pathways

Kaiser - Pathway 2

- Additional, feasible pollution control technologies can be identified
- PMP will include sequence of actions leading to design and installation of the next level of treatment (NLT) for PCBs

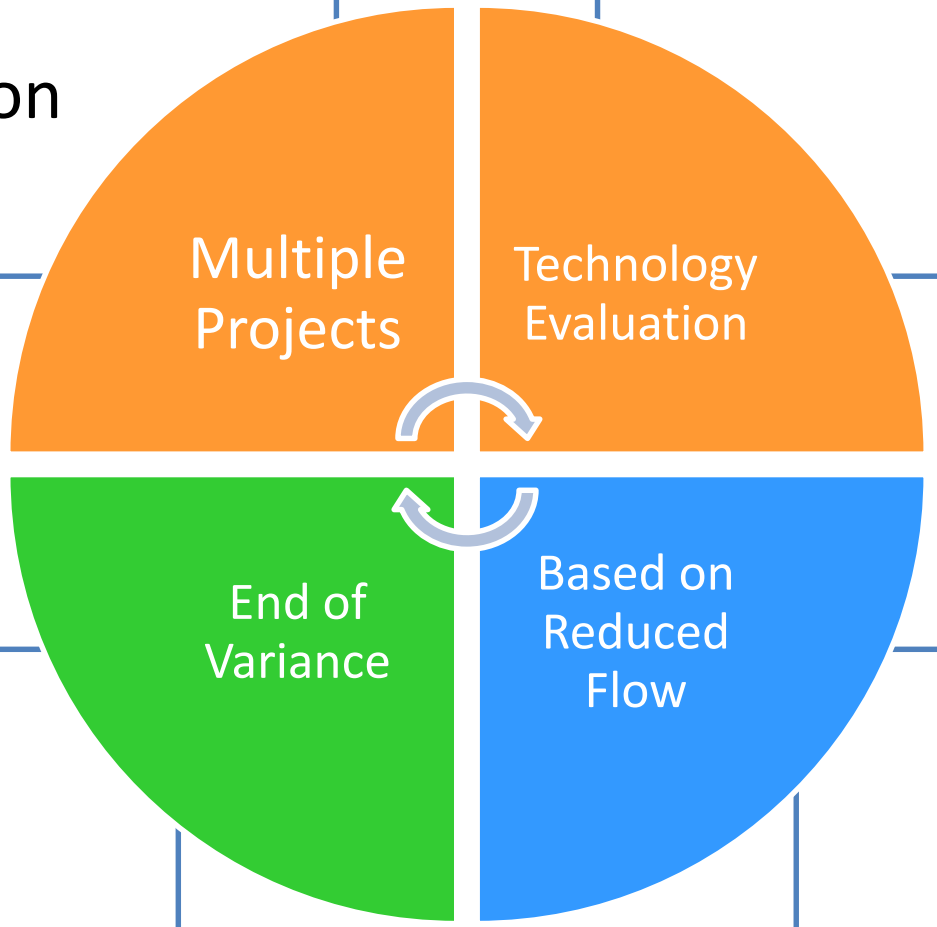
Inland Empire Paper - Pathway 3

- No additional feasible pollutant control technology can be identified with installation of their tertiary (membrane filtration) treatment system

Pathway for Kaiser

- Flow Reduction

- NLT Evaluation



- Install NLT

- Design NLT

Definition of Terms

Next Level of Treatment (NLT) = Greatest Pollutant Reduction Achievable

Example PMP Elements

- Organization
- Source ID/Reduction
  - Quality Assurance Project Plan for PCB Sampling
  - Site Specific Source ID/Reduction
- Mitigate Sources of PCBs
  - Optimize O&M Procedures
  - Screen for PCB Containing Materials
  - Conduct Periodic Literature Reviews to Identify Emerging Treatment Technology
  - Conduct Bench Scale/Pilot Scale Studies on Emerging PCB Treatment Technology

Example PMP Elements - continued

- Regional Coordination
  - Spokane Regional Toxics Task Force Activities
- Reporting
  - Annual Reports
- Adaptive Management
  - Response to Exceedences
  - Effectiveness Tracking
  - Identify New PMP Actions
  - Methods Used to Update PMP

Example PMP

Objective	Action	Frequency	Schedule	Goals
PMP Organization	Establish Team	Once, updated as necessary	Initial PMP	…
Source ID	QAPP Plan	Once, updated as necessary	Initial PMP	…
	…	…	…	…
Mitigate PCB Sources	Conduct Periodic Literature Review	Ongoing	Once/5 years	…
…	…	…	…	…

Initial PMP for Kaiser

- Plan Development & Implementation Team
- Implemented PMP Actions
- Effectiveness Tracking
  - Action Level and Statistical Tracking
- Considered and Proposed PMP Actions
  - North Sewer Source Investigations
  - Settling Basin Cleanout
  - Flow Reduction Projects
  - Screening for PCB Containing Materials
  - Building Demolition & Disposal Management Plan
  - PCB Containing Electrical Equipment Management Plan
  - Leak Prevention/Detection in Electrical Equipment
- Implementation Schedule

Initial PMP for Inland Empire

- Cross Functional Team
- Current and Past Source ID and Wastewater Reduction Efforts
- Installation and Optimization of Tertiary (Membrane Filtration) Treatment System
- Toxic Substances Control Act (TSCA) Reform
- Sourcing of Recycling Stream from Newsprint to Office Paper
- Monitoring Results

Questions/Comments?

https://pixabay.com/en/question-question-mark-survey-2736480/

Path to the HAC and Use of the HAC to Develop Permit Limits

Diana Washington

Water Quality Program

DEPARTMENT OF ECOLOGY
State of Washington

What is a HAC and how is it used?

Highest attainable condition (HAC) is a temporary water quality standard

Implemented with the pollutant minimization plan (PMP)

Used to get to water quality criteria for the identified use

HAC Representation in the Variance

Removal Efficiency

- Liberty Lake -- biological nutrient removal activated sludge followed by tertiary membrane filtration
- Spokane County -- membrane bioreactor
- City of Spokane -- biological nutrient removal activated sludge followed by tertiary membrane filtration

HAC Representation in the Variance Cont.

Concentration based

- Percentile or Confidence interval
- This might represent the monthly average and the daily max

Load based

- Concentration time flow
  - Actual flow
  - Design flow

How do we go from HAC to Permit Limits

- Evaluate the performance of each facility
- Use the actual facility performance data to set a limit
- Verify that the limit is within the bounds of the HAC
- Evaluate HAC at 3-5 year review — update permit limits

Approaches to Highest Attainable Condition Industrial Discharges

Pat Hallinan
Water Quality Program

DEPARTMENT OF ECOLOGY
State of Washington

Outline of Presentation

- Review of Discharge Data from Variance Application
- Considerations of Highest Attainable Condition
- Conversion to Permit Limits

Inland Empire Paper

	Concentration (pg/L)	Load (mg/day)
Min	799	22.1
Avg	3,342	86.2
Max	15,059	388.0
50th %ile	2,576	65.1
95th %ile	7,740	219.7
99th %ile	13,188	347.9
No of Samples	30	30

Considerations of Highest Attainable Condition – Inland Empire Paper

- Have 5 years worth of data
- However, effluent quality will improve with installation of membrane filtration system by the end of 2018; and implementation of PMP

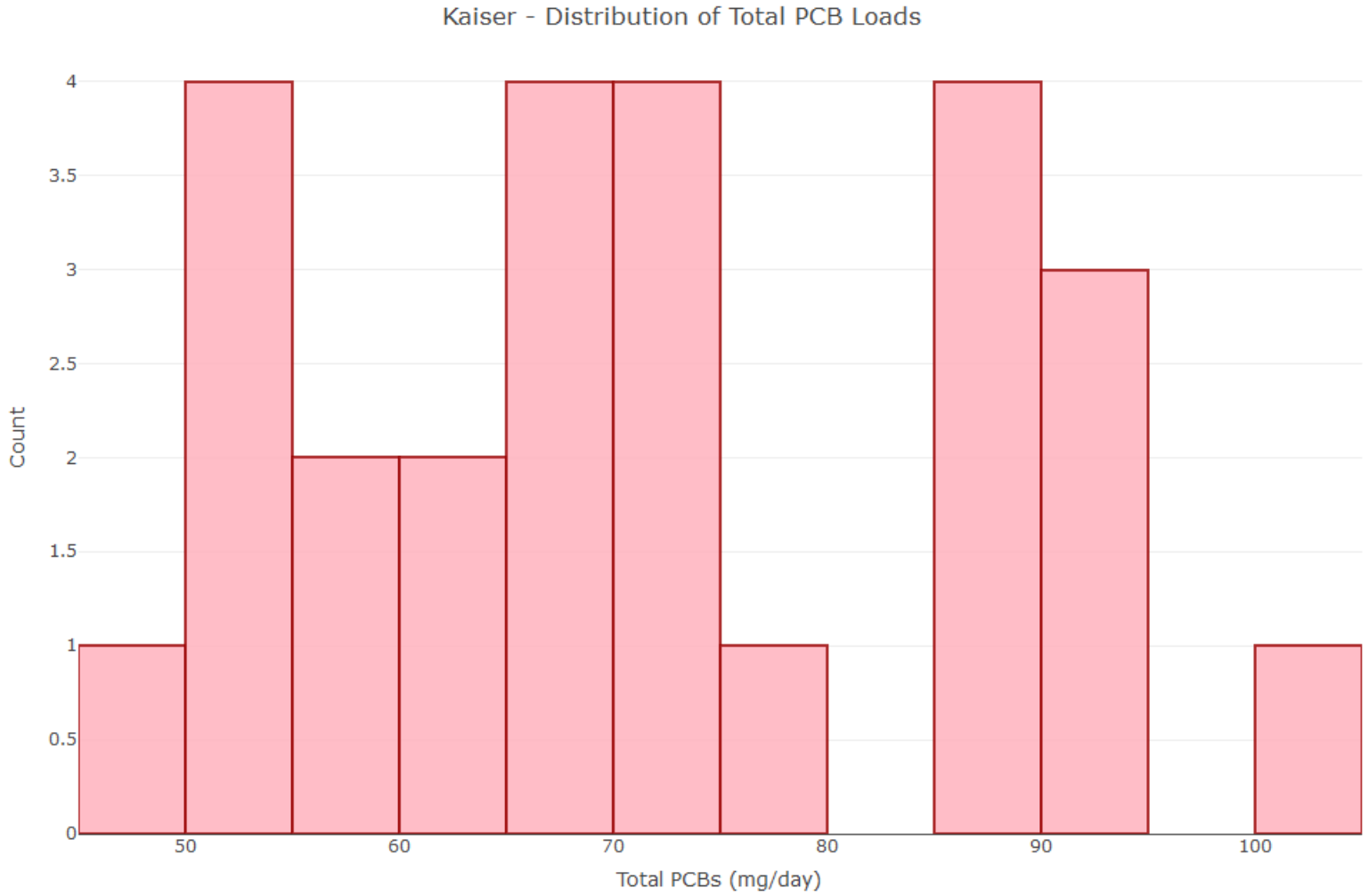
Considerations of Highest Attainable Condition – Inland Empire Paper

- Alternatives in specifying HAC include
  - Percent removal across treatment system
    - x% minimum removal based on treatment system influent and effluent loadings
  - Percentile effluent loading
    - 99^{th} Percentile value of effluent loadings
  - Distribution of data
    - Long term average?
    - Trend Analysis?

Kaiser Aluminum

	Concentration (pg/L)	Load (mg/day)
Min	1,523	49.8
Avg	2,278	72.0
Max	3,156	104.9
50th %ile	2,385	70.0
95th %ile	3,066	94.0
99th %ile	3,144	102.2
No of Samples	26	26

Kaiser Aluminum



Considerations of Highest Attainable Condition – Kaiser Aluminum

- Have good set of data
- Expect that loadings will decrease as Kaiser implements flow reduction projects and implementation of PMP
- Alternatives in specifying HAC include
  - Percent removal across treatment system
    - x% minimum removal based on treatment system influent and effluent loadings
  - Percentile effluent loading
    - 99th Percentile value of effluent loadings
  - Distribution of data
    - Long term average?
    - Trend Analysis?

Conversion to Permit Limits

Timing

- Will use all available effluent data at the time of permit reissuance

Procedure

- Will translate HAC (temporary WQ standard) into permit limits

Translation?

- A daily maximum and monthly average effluent limits - per 40 CFR Part 122.45(d)(1)
  - This may be a 99th percentile for daily maximum & 95th percentile for monthly average

Questions/Comments?

https://pixabay.com/en/question-question-mark-survey-2736480/

Wrap up

- Next Steps
- Closing discussion

THANK YOU!