Sediment Cleanup Users Manual II Technical Workshop (2nd of 3)

July 31, 2014

WA Department of Ecology

Toxics Cleanup Program

Goals and Objectives

- Communicate specific policy and technical issues identified during SCUM II public comment period
- Focus on this subset of issues at the workshops
- Collaboratively work to help Ecology resolve identified issues
- Engage in thoughtful discussion to elaborate on ideas proposed by commenters
- Ecology to come away with well thought out ideas to help finalize the guidance document

A Few Guiding Principles

- Focus on the main thing and ensure the main thing remains the main thing
- This is a limited and focused discussion on key unresolved issues
- Work to understand the needs or viewpoints of others to lead to workable solutions
- Have fun

Workshop Format

- Communicate what we plan to work on in the guidance
- Introduce key unresolved issues for discussion
- Pose specific questions to consider related to the issues
- We will record ideas and solutions for resolving the key issues under consideration to help finalize the guidance

Introduction

- In part, the SMS rule was revised to provide a more implementable cleanup framework for sites with bioaccumulatives because of:
  - Increased costs to cleanup to low levels
  - Inconsistency with cleanup decisions
- Key features of the revised SMS rule:
  - Recognition that cleanup is one key part of a broader strategy
  - Provide incentives to get cleanup done and minimize the lengthy process:
    - Regional background, cleanup units, recontamination clause
  - Integrate cleanup with broader source control and prevention measures to reduce contaminant concentrations to natural background or risk values:
    - PLP source control, sediment recovery zones, post cleanup monitoring

Why We're Doing What We're Doing

- Implementing the revised SMS rule includes incorporating and considering a range of scientific, policy, and practical issues.
- The rule and draft guidance attempt to reasonably balance:
  - Flexibility and predictability
  - False positives and false negatives
  - Short term cleanup actions and longer term source control and prevention measures
- Based on the comments, we need to improve on this attempt to better reflect the rulemaking goals and objectives

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Issues / Themes

- **Burdensome process**: Cleanup process too burdensome due to more conservative requirements (cleanup levels, assessments)
- **Feasibility:**
  - New SMS rule more conservative
  - SCUM II incorporates more conservative assumptions than the already conservative SMS rule
  - Resulting in unattainable cleanups
- **Streamlined process**: Develop more streamlined processes to get cleanup done, reduce risk, and provide finality for PLPs

Issues / Themes – Proposed Ideas

- **Streamlined Process**: Determine a process to make cleanup more efficient (for both simple and complex sites)
- **Simple vs. Complex Sites**: Develop a more efficient process for simple sites that is less burdensome than for complex sites
- **Bioavailability:** Incorporate new technologies and assess availability of bioaccumulative CoCs
- **Attaining Compliance:** Develop successful monitoring approach
- **Remedy Selection:** Include more approaches
- **Recontamination:** How to determine if source control is effective

Three Technical Workshops –Topics

July 17, 2014	July 31, 2014	August 7, 2014
• Preliminary CSM • Simple or Complex Sites • Screening CoPCs • Use/Need for Tissue Data	Natural/Regional Background: • Statistical Metrics • Regional Background Definition	• Establishing Cleanup Levels • Adjusting from SCO
• Remedial Investigations: • Simple vs. Complex Sites • Default screening values	Compliance Monitoring: • Area weighted averaging • Point by point • Incremental sampling • Use of tissue data	Remedy Selection
Bioavailability	Establishing PQLs	Sediment Recovery Zones: Monitoring requirements
Ecological risk assessments		Recontamination: • Monitoring for remedy failure/source control • Settling liability

SCUM II - Framework and Reorganization

- **Chapter 1**: SMS rule framework & guidance document organization
- **Chapter 2**: Identification of sites and sediment cleanup units:
  - Default screening approaches for bioaccumulatives
  - Use of sediment background
  - Use of tissue background
  - Use of area weighted averaging for bioaccumulatives

SCUM II - Framework and Reorganization

Chapter 3: Remedial Investigation Workplan and Preliminary Conceptual Site Model:

- RI goals and objectives
- Develop preliminary CSM for screening purposes
- Evaluate size and complexity of site (simple vs. complex)
- Identify pathways, receptors, and screen CoPCs
- Identify RME – use of default
- Identify exposure areas, site units, and/or sediment mgmt areas
- Identify data gaps

SCUM II - Framework and Reorganization

- **Chapter 4:** Field Sampling Methods
- **Chapter 5:** Chemical and Biological Testing and QA/QC procedures
- **Chapter 6:** Remedial Investigation Report and Data Evaluation:
  - Contents and requirements of RI Report
  - Contents and requirements of human health and eco risk assessments
  - Data treatment methods and data submittal requirements

SCUM II - Framework and Reorganization

- **Chapter 7**: Cleanup standards framework
  - **Chapter 8**: Benthic criteria
  - **Chapter 9**: Human health criteria
  - **Chapter 10**: Higher trophic level criteria
  - **Chapter 11**: Natural and regional background
  - **Chapter 12**: Practical quantitation limits.
- **Chapter 13**: Feasibility study & remedy selection
- **Chapter 14**: Sediment recovery zones
- **Chapter 15**: Compliance monitoring
- **Chapter 16**: Applicable laws and authorizations required
- **Chapter 17:** References

Some Background on Background

As one tool amongst several in the SMS rule, regional background is intended to help:

- Address the reality of ubiquitous contaminants continuously entering the environment.
- Provide a technically implementable structure to meet and maintain cleanup standards given the potential for recontamination from diffuse and uncontrollable sources.
- Include some influence from definable sources such as piped stormwater, but not the direct influence (that is, the primary contributor).

Some Background on Background – What We've Heard

- Regional background:
  - To be an implementable provision, regional background should:
    - Be established at the level of recontamination from stormwater sources
    - Reflect stormwater influence, by sampling closer to stormwater sources
  - Ecology should provide a process that allows PLPs or other parties to establish background (regional or natural)
  - Ecology should maintain a focus on risk rather than background or PQLs
- Natural background:
  - Natural background should be different for different areas

Natural & Regional Background

What we plan to do:

- Refine and clarify the text providing definitions of both natural and regional background
- Emphasize that the case studies for regional background (the embayments where we are currently working) are examples and there is area specific flexibility to do something different
- Include updated methods for calculating regional background based on lessons learned to date
- Provide more detail on sampling and statistical methods for calculating background

Natural & Regional Background

More things we plan to do:

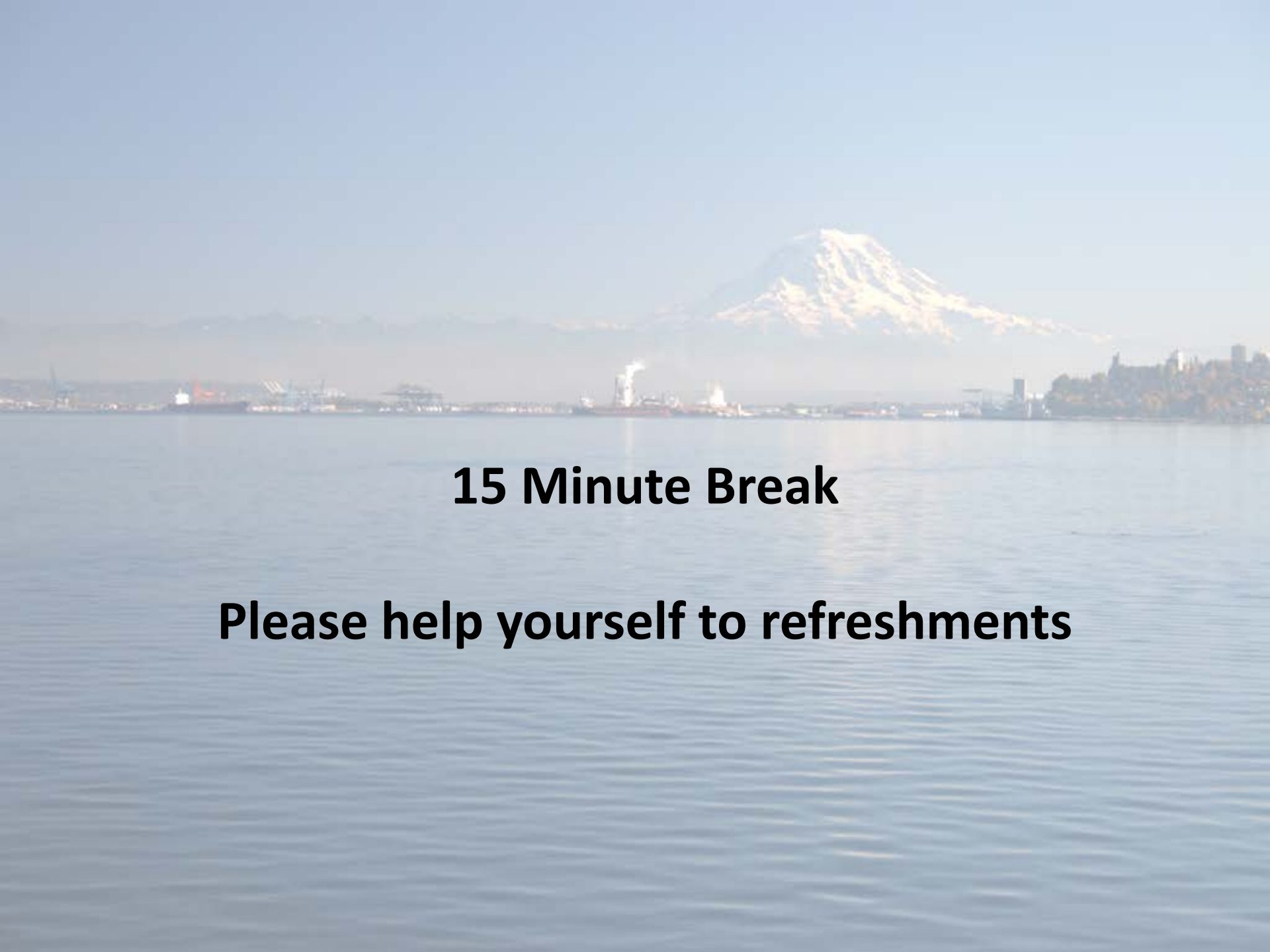
- Clarify how stormwater should be addressed
- Clarify how to determine compliance with a background-based cleanup level
- Provide a process for updating natural and regional background
- Describe approaches for sites with no regional or natural background
- Address development and use of tissue background data sets

Natural Background – Definitions & Methods

Issue	Questions for Discussion
1) Natural background methods	1a) For Puget Sound, always use Bold Plus or allow subsets of data? How would subsets be chosen? 1b) Need separate values for coastal/strait areas and Puget Sound? 1c) For freshwater, focus on statewide natural background or provide guidance on reference areas?
2) Tissue background data sets would be helpful in the RI/FS process	2a) Is there any guidance on how to develop a robust data set (e.g., from past Superfund sites)? 2b) Are there sources of funding we should be pursuing, similar to the Bold study? 2c) Natural only or regional also?

Regional Background – Definitions & Methods

Issue	Questions for Discussion
3) Regional background excludes sampling in depositional zones of outfalls	3a) If a clear depositional zone exists, how do we determine where the "primary" or "direct" influence ends? 3b) If a clear depositional zone does not exist, how do we determine where we can sample? 3c) Are there completely different approaches to stormwater we should consider?
4) Regional background methods	4a) What would be the most useful information to include in SCUM II about sampling approaches? 4b) How should the approach for river systems differ from marine and lakes? 4c) Other approaches?



15 Minute Break

Please help yourself to refreshments

Establishing the SCO, CSL & Cleanup Level

- To establish the SCO and CSL for each CoC, the SMS requires that the PQL, background, and risk based concentrations (RBCs) be established as numeric values (or bright line thresholds), with the highest value selected as the SCO or CSL
- The cleanup level for each CoC is also a numeric value used to determine compliance, falling somewhere in the range of the SCO or CSL
- Cleanup levels for different CoCs may be based on different things; once they are established, they should be treated simply as bright line thresholds regardless of how they were developed

Establishing Background Thresholds

Ecology recommends the 90/90 UTL of the background data sets:

- **Compliance:** If this level is exceeded, we will have reasonable certainty that site concentrations actually exceed background
- **Non-detects:** A UTL is a confidence limit on an upper percentile of the distribution rather than the mean, and therefore can be calculated when there are a large number of non-detects in the data set
- **Analytical Uncertainty:** In data sets with many concentrations at or below PQLs, the upper end of the tail is less likely to be affected by analytical uncertainty, which is high at the concentrations we're working with
- **Conservativeness:** Despite being an upper statistic of the distribution, these concentrations are generally low and will push the limits of technical feasibility
- **Regulatory Consistency:** At this threshold, the cleanup program would remain consistent with DMMP decision making
- **Site Identification:** A different statistic, such as the 95th UCL on the mean, results in lower values. This will result in large areas of the state above the SCO and CSL and potentially being defined as cleanup sites

Determining Compliance – Post Cleanup

What we plan to do:

- Clarify alternatives for determining compliance and when they would be appropriate
  - Point by point
  - Mean or area-weighted average
- Discuss sampling designs and statistics for the various approaches
- Clarify how tissue data can be used to aid in determining compliance
- Consider new approaches, such as incremental sampling

Determining Compliance – Alternatives

Issue	Questions for Discussion
1) Point by point	1a) Does this approach appropriately reflect exposure for the benthic community, regardless of environment (intertidal/subtidal)? 1b) Could this approach be used for bioaccumulative chemicals? Under what circumstances? 1c) Is there a threshold data set size below which we should generally use point by point comparisons? 1d) Use station clustering rules to interpret results? For example, require 3 stations to exceed the cleanup level? Or use statistical approach based on sample size?
2) Arithmetic or area-weighted mean	2a) Use only for bioaccumulatives when there is an area-based exposure pathway? Any other circumstances under which it would be appropriate? 2b) Is there a minimum data set or sampling density required?

Determining Compliance - Alternatives

Issue	Questions for Discussion
3) Incremental sampling (to obtain a mean) – variation on 2) above	3a) Appropriate for compliance monitoring for area-based exposures? 3b) Sampling guidance available (sample sizes, design, etc.)? Appropriate for some strata and not others? 3c) Need a contingency plan for resampling or archived samples if mean exceeds the cleanup level? 3c) Other pros and cons or considerations?
4) Using tissue data in a weight-of-evidence approach	4a) If sediment and tissue data conflict, how should that information be interpreted and used for compliance purposes? 4b) Give more weight to bioaccumulation testing and/or sedentary species like shellfish? Or to fish of importance to receptors/humans?

Population to Population Comparisons

Distributional comparisons have many uses during the RI/FS, although they cannot be used directly for comparison to cleanup standards:

Example	Questions for Discussion
1) Exploration of data sets	1a) For example, to identify whether data distributions are comparatively shifted, wider/narrower, fall within the same range, have tails that extend beyond the other, and to evaluate apparent outliers. 1b) Other ideas?
2) Screening CoCs	2) When the final CoCs are identified at the end of the RI, distributional comparisons could be used screen out chemicals below background, with a sufficient data set. This would be similar to screening out chemicals that are within acceptable risk levels. For these chemicals, no cleanup levels would be set.

15 Minute Break

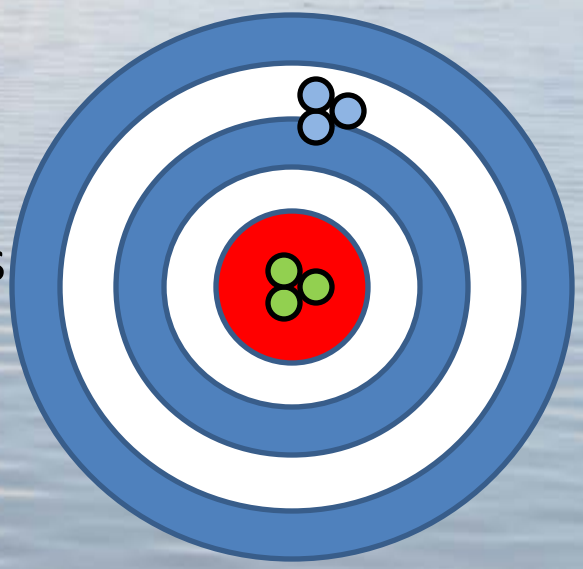
Please help yourself to refreshments

Practical Quantitation Limits: Background

Some background on analytical variability

- Accuracy:
  - How close you are to a “true value”
  - Often quantified via % recovery of matrix spikes
  - Can also be characterized through use of standard reference materials.

- Precision:
  - Agreement between replicates/duplicates
  - Doesn’t necessarily have to be accurate!



Practical Quantitation Limits: Background

Examples of accuracy and precision:

- Puget Sound SRM
- OSV Bold survey, selected CoCs

Rationale behind PQL as SCO/CSL: Need to consider variability of data at/below PQL

- Sample heterogeneity
- Analytical variability

PQLs – Some More Background

- Ecology recently used the SMARM process to define how PQL-based cleanup standards would be established on a programmatic basis
- Ecology proposed a central tendency of what commercial laboratories could achieve, because:
  - Lower values do not have sufficient precision or accuracy to be meaningful
  - As a result, determining compliance with such values would be difficult
  - There is a tendency for numbers below the PQL to be treated as "real" when in fact they are not statistically distinguishable from one another (a precision issue)
  - All accredited laboratories should have the opportunity to participate in monitoring activities – not just a select few
- Ecology proposed that the PQLs are translated into TEQ where appropriate, because TEQs allow comparison to risk-based and background-based levels

PQLs – Accuracy and Precision

How accurate and precise are data at or below PQLs?

Accuracy Example - Puget Sound Standard Reference Material:

- Low concentration reference material from Duwamish River
- Dried, sieved, homogenized thoroughly and sent to 10 labs for the round robin testing used to determine the "true" value (average)
- These data are examples of "true" values at or slightly above PQLs
- Half the labs would declare the values below PQL, half above.

Parameter	PQL	Average	SD	Min	Max	# Detects
2,3,7,8-TCDD	1	1.1	0.25	0.695	1.50	10 of 10 labs
TCDD-TEQ	5	5.5	1.04	3.77	7.14	N/A

PQLs – Accuracy and Precision

How accurate and precise are data near PQLs?

Precision Example – OSV Bold Field duplicates

- Five of 70 OSV Bold samples were field duplicates.
- Selected CoC data shown for discussion purposes
- Difficult to determine how much variability is due to sample heterogeneity, but it doesn't appear to be strictly related to fines/TOC.

PQLs – Accuracy and Precision

How accurate or precise is data: Natural Background precision example

Field Splits	BaP	BaP TEQ (0.5 DL)	PCB 77 [PQL=2]	PCB TEQ (0 DL)	2,3,4,7,8-PeCDF	D/F TEQ (0.5 DL) PQL = 5	% TOC	% fines
CPS 3	8.1	18.2	11.4	0.007	0.592 J	1.37	1.55	19.9
CPS 3 dup	4.3	7.1	3.46	0.005	0.720 J	1.62	1.49	20.7
HC2	4.0 U	3.6	1.26 U	0.004	0.463 J	1.15	3.65	98.5
HC2 dup	4.0 U	5.4	9.04 U	0.001	1.28 J	3.38	4.33	76.5
NCPS 2	3.0 U	6.8	15	0.010	0.660 J	1.23	0.64	29.3
NCPS 2 dup	3.3	5.9	5.95	0.004	0.608 J	1.07	0.95	25.4
PSPS 1	2.8 U	**2.1**	12.2	0.007	0.906 J	2.19	2.31	92.7
PSPS 1 dup	3.0 U	**8.5**	4.09	0.002	0.532 J	1.12	2.03	96.3
SPSB0	6.0	13.3	5.69	0.001	0.817 J	1.58	2.24	76.4
SPSB0 dup	6.8	11.5	3.21	0.002	0.830 J	1.65	2.07	83.2

Practical Quantitation Limits

What we plan to do:

- Consider establishing a consistent definition based on feedback from laboratories
- Clarify how to establish a PQL based cleanup level
- Clarify difference between PQLs as cleanup levels and PQLs used in the remedial investigation
- Consider scientific validity of the use of TEQs to establish PQL based cleanup levels

PQLs – Definitions & Field/Lab Variability

Issue	Questions for Discussion
1) Inconsistent PQL definitions	1a) What issues should be considered to find a consistent PQL definition for laboratories to use? 1b) Does guidance exist that Ecology can draw from to establish a common definition for our purposes?
2) Use of PQLs for different purposes: • During the RI • To establish the SCO, CSL, cleanup level	2a) How can the discussion in SCUM II be revised to clarify the distinction between RI/FS analytical PQLs and a programmatic PQL-based cleanup standard? 2b) When might a site-specific PQL-based cleanup standard that varies from the programmatic value be appropriate to use?

PQLs – Establishing the SCO and CSL

Issue	Questions for Discussion
3) Developing programmatic PQLs	3a) What minimum criteria should be established for PQL laboratory surveys to update programmatic PQLs or determine site-specific PQLs to establish the SCO, CSL, and cleanup level? 3b) How should lab/field variability (accuracy and precision) be considered?
4) Use of sum TEQ to develop programmatic PQL-based cleanup levels	4a) Should TEFs be applied to analytical benchmarks such as PQLs that do not represent environmental data? 4b) How appropriate is it to use human health TEFs to develop PQL-based cleanup levels for all receptor groups? 4c) Would developing PQLs for individual compounds be more defensible than the current summed approach? How could we compare these values to risk- and background-based TEQ values?

August 7 Technical Workshop – Preliminary Agenda

- **Establishing Cleanup Levels**
  - Use of multiple cleanup standards and / or remediation levels
  - Adjusting upwards from the Sediment Cleanup Objective
  - Interpretation of technically possible/adverse impacts criteria

- **Remedy Selection**
  - Technologies:
    - Consideration of in situ amendments
    - Simple vs complex sites: Use of select remedies
    - Marine vs. river systems: Consideration of unique approaches
  - Disproportionate Cost Analysis: Alternative approaches

- **Sediment Recovery Zones**
  - Monitoring requirements and who does what

- **Recontamination**
  - Remedy effectiveness and PLP source monitoring
  - Issues related to settling liability

SCUM II – Timeline and Next Steps

March – May 2014

Draft posted for a 75 Day Public Comment Period

→

May – June 2014

Process Public Comments

→

July 17 & 31 & August 7, 2014

Conduct Technical Workshops to Discuss Specified and Resolve Issues

→

Fall 2014

Utilize Collective Feedback to Finalize SCUM II

→

Ongoing

Continue to update SCUM II through SMARM

For More Information

- **Sediment Management Standards**:

  http://www.ecy.wa.gov/programs/tcp/smu/sed_standards.htm
- **Sediment Cleanup Users Manual II**:

  https://fortress.wa.gov/ecy/publications/SummaryPages/1209057.html
- **Port Gardner Regional Background**:

  http://www.ecy.wa.gov/programs/tcp/sites_brochure/psi/everett/pg-sed.html
- **Port Angeles Regional Background**:

  http://www.ecy.wa.gov/programs/tcp/sites_brochure/portAngelesHarborSed/background.html
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