



Responsiveness Summary

Response to Comments on:

**Method B and C Target Cleanup Goals and
Adjustment for Additive Risk and Hazard**

Toxics Cleanup Program

Washington State Department of Ecology
Olympia, Washington

October 2026, Publication 26-09-059

Publication Information

This document is available on the Department of Ecology's website at:
<https://apps.ecology.wa.gov/publications/summarypages/2609059.html>

Related Information

- [Cleanup and Risk Calculation \(CLARC\) workbook](#)¹

Contact Information

Toxics Cleanup Program

P.O. Box 47600
Olympia, WA 98504-7600
Phone: 360-407-7170

Website²: [Washington State Department of Ecology](#)

ADA Accessibility

The Department of Ecology is committed to providing people with disabilities access to information and services by meeting or exceeding the requirements of the Americans with Disabilities Act (ADA), Section 504 and 508 of the Rehabilitation Act, and Washington State Policy #188.

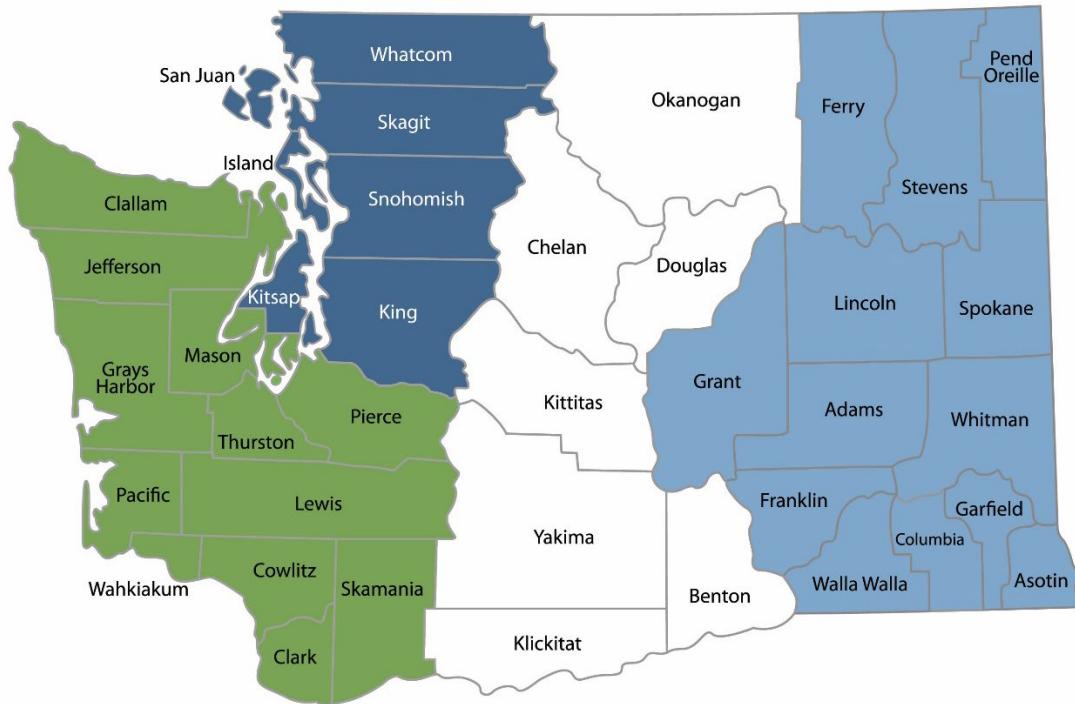
To request an ADA accommodation, contact Ecology by phone at (360) 407-6381 or email ecyADAcordinator@ecy.wa.gov. For Washington Relay Service or TTY call 711 or 877-833-6341. Visit ecology.wa.gov/ADA for more accessibility information.

¹ <https://www.ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-cleanup-tools/clarc/data-tables>

² www.ecology.wa.gov/contact

Department of Ecology's Regional Offices

Map of Counties Served



Southwest Region
360-407-6300

Northwest Region
206-594-0000

Central Region
509-575-2490

Eastern Region
509-329-3400

Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	P.O. Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	P.O. Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 West Alder Street Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 North Monroe Spokane, WA 99205	509-329-3400
Headquarters	Statewide	P.O. Box 47600 Olympia, WA 98504	360-407-6000

Responsiveness Summary

Method B and C Target Cleanup Goals and Adjustment for Additive Risk and Hazard

Toxics Cleanup Program
Washington State Department of Ecology
Olympia, WA

October 2026 | Publication 26-09-059



DEPARTMENT OF
ECOLOGY
State of Washington

Contents

Responsiveness Summary.....	
Publication Information	2
Related Information.....	2
Contact Information.....	2
ADA Accessibility.....	2
Department of Ecology’s Regional Offices	3
Map of Counties Served.....	3
Responsiveness Summary.....	4
List of Tables	7
Acronyms and Abbreviations.....	8
Chapter 1: Introduction	9
Chapter 2: Public Review and Comment	10
2.1 Public Notice	10
2.2 Comment Opportunity.....	10
2.3 Commenters.....	10
2.4 Comments.....	10
Chapter 3: Response to Comments	12
Issue 1: How do you consider natural background in calculating site risk?	12
Issue 2: How do you consider downward cleanup level adjustments that fall below PQL?	13
Issue 3: How do you make additive risk adjustments when site contaminants are localized in different locations?	13
Issue 4: A concern is that this guidance will lead to more site-specific risk assessments rather than using Standard Methods B or C.....	14
Issue 5: Requiring additive risk adjustments may result in a shift to excavation and off-site disposal.....	15
Issue 6: Requiring additive risk adjustments where human exposure is unlikely will result in unnecessary cleanup effort and increase costs.....	15
Issue 7: Include guidance on when additive risk adjustments or site-specific risk assessments are necessary.	16
Issue 8: Clarify position on the use of maximum contaminant levels (MCLs) and their sufficiency for protection of human health.....	18
Issue 9: Include more discussion on the importance of a conceptual site model (CSM) to inform cleanup levels.....	19
Issue 10: Provide more discussion in the guidance on factors used for contaminant screening and selection of cleanup levels.	20
Issue 11: Include relevant ecological risk guidance and cleanup criteria.....	21

Issue 12: Clarify the use of Method A values when using Method B or C and when those values may need to be adjusted to account for additive risk.....	22
Issue 13: Clarify the use of soil leaching to groundwater values in the additive risk evaluation.	24
Issue 14: Provide more guidance on how to apportion additive risk when performing downward adjustments from multiple hazardous substances.	24
Issue 15: Provide more discussion in the guidance on factors used for contaminant screening such as those included in EPA’s Risk Assessment Guidance for Superfund (RAGS).	25
Issue 16: Clarify the phrase, “15 carcinogens are present...” in the additive risk example in Section 1.1.....	26
Issue 17: Clarify significant figure rounding and compliance requirements for both individual chemicals and when considering cumulative risk.....	27
Issue 18: Provide guidance on summation parameters (e.g., cPAHs and dioxins/furans) in making additive risk adjustments.	27
Issue 19: The ARAR adjustment (in Section 5.5, Example 2) discussed for PCBs in soil contradicts the information provided in Example 2 for MCL-based ARARs.....	28
Issue 20: Clarify the difference between Method A TPH table values and site-specific Method B or C values using MTCA equations. Under Methods B or C, should the additive site risk account for TPH?	29
Issue 21: When should one use exposure factors from MTCA versus those in SMS? What is the prioritization?.....	31
Issue 22: How do you approach total site risk when you may have one type of source and chemical release as opposed to multiple unrelated sources and contaminants?	32
Issue 23: There are “Error! Bookmark not defined” errors in the provided links.	33
References	34
Appendix A: Index of Public Comments.....	36
Appendix B: Public Comments.....	38
Endnote References.....	52

List of Tables

Table 1: Index of commenter information	36
--	----

Acronyms and Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
CLARC	Cleanup levels and risk calculations
COC	Chemical of concern
COPC	Chemical of potential concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
CSM	Conceptual site model
CUL	Cleanup level
Dx	Diesel and oil range compounds
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
EPH	Extractable petroleum hydrocarbons
EU	Exposure unit
FS	Feasibility study
Gx	Gasoline range compounds
HI	Hazard index
HPAH	High molecular weight polycyclic aromatic hydrocarbons
HQ	Hazard quotient
LPAH	Low molecular weight polycyclic aromatic hydrocarbons
MCL	Maximum contaminant level
MTCA	Model Toxics Control Act
PAH	Polycyclic aromatic hydrocarbon
PCBs	Polychlorinated biphenyls
PMEP	Permanent to the maximum extent practicable
PQL	Practical quantitation limit
RAGS	Risk assessment guidance for superfund
RfD	Reference dose
RI	Remedial investigation
RME	Reasonable maximum exposure
SCUM	Sediment cleanup user's manual
SMS	Sediment management standards
TCE	Trichloroethylene
TEE	Terrestrial ecological evaluation
TEF	Toxicity equivalence factor
TEQ	Total toxic equivalent concentration
TPH	Total petroleum hydrocarbons
TSCA	Toxic substances control act
VC	Vinyl chloride
VPH	Volatile petroleum hydrocarbons
WAC	Washington administrative code

Chapter 1: Introduction

The purpose of this responsiveness summary document is to provide the Washington State Department of Ecology's (Ecology's) response to public comments on its draft guidance [*Method B and C Target Cleanup Goals and Adjustment for Additive Risk and Hazard*](#), Ecology publication [26-09-058](#).³ Ecology prepared this guidance to show how and when cleanup levels may need to be adjusted to comply with total site cancer risk and noncancer hazard thresholds defined in the Model Toxics Control Act (MTCA). Ecology provided responses to public comments to explain Ecology's rationale for its decisions and document where changes were made in the documents based on the comments. This responsiveness summary is not required by the Administrative Procedure Act ([RCW 34.05.325](#)ⁱ).

³ <https://apps.ecology.wa.gov/publications/documents/2609058.pdf>

Chapter 2: Public Review and Comment

2.1 Public Notice

Ecology provided an opportunity to review the draft guidance during a public comment period from May 28 through June 29, 2026. Notice of the public comment period was published in:

1. Toxics Cleanup Program's [Contaminated Site Register](#)⁴, which was emailed to about 1,550 subscribers on [May 28](#)⁵, [June 11](#)⁶, and [June 25](#)⁷.
2. Mass email notification on May 28 to about 1,300 people who subscribe to the agency's [Model Toxics Control Act and Sediment Management Standards Rule Update email list](#)⁸, which provides updates on the cleanup program.

2.2 Comment Opportunity

Ecology accepted public comments on the guidance for 32 days between May 28 and June 29, 2026. Comments were accepted through our online [SmartComment web portal](#)⁹.

2.3 Commenters

In total, 6 individuals and organizations submitted comments on the draft guidance. Ecology assigned each commenter with a unique identification (ID) number (1 to 6). See **Appendix A** for the list of commenters.

2.4 Comments

While Ecology received comments from 6 different individuals and organizations, some submittals contained more than one comment. Ecology identified a total of 28 separate comments in the submittals.

Ecology assigned each comment in the submittals a unique number. The first number is the commenter ID and the second number refers to the comment in the submittal. For example, Comment ID 2-3 means the commenter ID is 2 and the comment number is 3 in that submittal.

⁴ <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/site-register-lists-and-data#SiteRegister>

⁵ <https://apps.ecology.wa.gov/publications/SummaryPages/2609041K.html>

⁶ <https://apps.ecology.wa.gov/publications/documents/2609041I.pdf>

⁷ <https://apps.ecology.wa.gov/publications/documents/2609041m.pdf>

⁸ https://public.govdelivery.com/accounts/WAECY/subscriber/new?topic_id=WAECY_102

⁹ <https://ecology.commentinput.com/?id=ekmEsfZSg>

Based on the comments, Ecology identified a total of 23 different issues. Each issue is based on one or more comments from one or more individuals or organizations. In Chapter 3 of this document, Ecology provides a response to each of the identified issues.

Appendix A lists all comment IDs with corresponding issue number for which Ecology provided responses. Public comments with annotated comment segment numbers can be found in **Appendix B**.

Chapter 3: Response to Comments

This chapter provides Ecology's response to submitted comments. As described in Chapter 2 of this document, the comments raised a total of 23 separate issues.

Issue 1: How do you consider natural background in calculating site risk?

Comment:

Please provide more instructions and examples on how to approach contaminants with natural background concentrations that exceed cleanup levels. Can cancer risks or noncancer hazards associated with natural background concentrations be zeroed out when calculating total site risks?

Comment IDs: 2-1 and 5-11

Response:

The question of whether cancer risks or noncancer hazards associated with natural background concentrations can be zeroed out is discussed in the blue note box presented in Chapter 1: Summary. Under the Model Toxics Control Act (MTCA), natural background concentrations and practical quantitation limits (PQLs) for a substance must also be considered when setting cleanup levels under Methods B and C. In these situations, the cleanup level (CUL) would be established at a concentration equal to natural background or the PQL, whichever is higher (see [WAC 173-340-700](#)ⁱⁱ(6)(d)). In addition, as discussed in the blue note box in Chapter 1 of the guidance, cancer risk and noncancer hazard associated with cleanup levels set at natural background or the PQL can be zeroed out (i.e., not included in the additive risk calculation) when evaluating compliance with additive cancer risk and noncancer hazard goals. As such, one would not make downward adjustments to CULs to account for risks and noncancer hazards associated with natural background or PQL.

Chapter 5.3 of the guidance identifies the steps for identifying CULs under Methods B and C. It also provides the general process for evaluating whether or not CULs need to be downward adjusted. However, it does not include a discussion for situations where the identified Method B or C CUL for a chemical (derived using the methods specified in MTCA) is less than its natural background level or a level that can be reliably measured (i.e., PQL).

[The approach for considering natural background and the PQL in setting and adjusting CULs will be included in Chapter 5.3 of the final guidance.](#)

Issue 2: How do you consider downward cleanup level adjustments that fall below PQL?**Comment:**

The guidance doesn't address how to handle a chemical whose downward adjusted cleanup level (to meet cumulative risk and noncancer hazard thresholds) falls below its PQL. In this case, can the adjusted cleanup level set at the PQL be excluded from the additive risk calculation? Recommend clarifying how this scenario should be treated in Chapter 1 of the guidance.

Comment ID: 5-12

Response:

As stated in Issue 1, risks and noncancer hazards associated with Method B and C CULs established at natural background or the PQL can be zeroed out (i.e., not included in the additive risk calculation) when evaluating compliance with additive cancer risk and noncancer hazard goals. Risks and noncancer hazards for CULs established at levels above natural background or the PQL are included in the total site risk evaluation. It is important to note that CULs adjusted to comply with additive risk and noncancer hazard goals shall not be set at levels below the PQL or natural background concentration, whichever is higher (see [WAC 173-340-705ⁱⁱⁱ\(6\)](#); [WAC 173-340-706^{iv}\(6\)](#)). As such, CULs that have been downward adjusted to their lower limit (i.e., natural background or PQL) remain in the additive risk and noncancer hazard evaluation but cannot be further downward adjusted.

[The approach for considering natural background and the PQL in setting and adjusting CULs will be included in Chapter 5.3 of the final guidance.](#)

Issue 3: How do you make additive risk adjustments when site contaminants are localized in different locations?**Comment:**

How should I make additive risk adjustments when contaminants are not co-located or are localized in different locations at the site?

Comment ID: 2-2

Response:

As part of a site investigation, a conceptual site model (CSM) should be developed that describes release mechanisms from sources of hazardous substances, the exposure media and routes (e.g., ingestion), and the potential receptors. This model reflects current conditions and possible future development in assessing exposure pathways.

Sites that have different areas of separate and distinct localized contamination may be the result of multiple source areas and releases. Based on the CSM, sites may be divided into

multiple exposure units (EUs). An EU is the area over which people are expected to be exposed to contamination at a site over time, and where cleanup actions are being considered. EUs at a site can be evaluated separately for compliance with cleanup standards including additive risk adjustments. Factors such as land use, types of human receptors and activity patterns, types and locations of waste sources and contaminants, and uniformity of site concentrations may inform the identification of EUs. EUs are discussed in Ecology's 1992 [*Statistical Guidance for Ecology Site Managers*](#)¹⁰ (Ecology, 1992).

Ecology did not make any changes to the guidance based on this comment.

Issue 4: A concern is that this guidance will lead to more site-specific risk assessments rather than using Standard Methods B or C.

Comment:

A concern is that this new guidance will lead to more site-specific human health risk assessments—rather than using Standard Method B or C—in an effort to “risk away” contamination during MTCA cleanups.

Comment ID: 3-1

Response:

MTCA is designed to focus on cleanup levels rather than risk assessments. Therefore, the focus of this guidance is to provide instruction on how to adjust CULs under Methods B and C to comply with MTCA's total site risk requirements (see [WAC 173-340-708](#)^v (5) and (6)). This can be a complex process that requires some knowledge of how to derive MTCA cleanup levels including how to express those levels in terms of cancer risk and noncancer hazard. The examples provided in the guidance use a simplified approach in which cancer risk and noncancer hazard are calculated from the standard Method B and C CULs identified in our [Cleanup Levels and Risk Calculation \(CLARC\) database](#)¹¹.

Risk assessments are allowed in specific, uncommon situations, including evaluating the protectiveness of a remedial alternative ([WAC 173-340-357](#)^{vi}) and establishing cleanup levels for nonpotable groundwater ([WAC 173-340-720](#)^{vii}(6)(c)). This guidance does not advocate for site-specific risk assessments but rather demonstrates how to adjust cleanup levels to account for the presence of multiple chemicals. The procedures in this guidance will result in either no changes or downward adjustments to cleanup levels, making them more stringent. This guidance does not provide procedures for increasing cleanup levels.

¹⁰ <https://apps.ecology.wa.gov/publications/summarypages/9254.html>

¹¹ <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-cleanup-tools/clarc>

Ecology did not make any changes to the guidance based on this comment.

Issue 5: Requiring additive risk adjustments may result in a shift to excavation and off-site disposal.

Comment:

Requiring cleanup levels to be adjusted to meet additive risk and noncancer hazard thresholds in situations where human exposure is unlikely (for example, when contaminated soil is at a depth that prevents direct contact) results in unnecessary effort and increased costs to achieve regulatory closure, without providing any meaningful reduction in risk to a receptor.

Comment ID: 6-1

Response:

MTCA cleanup levels are based on an estimate of the reasonable maximum exposure (RME) that is expected to occur under both current and future land use conditions (see [WAC 173-340-708^v\(3\)](#)). Under MTCA, a soil cleanup standard consists of a concentration (cleanup level) that must be met at a specified location within the soil (point of compliance). For soil cleanup levels based on direct contact, the point of compliance is defined as throughout the site from the ground surface to fifteen feet below the ground surface (see [WAC 173-340-740^{viii}\(6\)\(d\)](#)). This represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities. Target risk-based goals for individual chemicals and based on additive risk (cancer and noncancer) under MTCA for Methods B and C are the same throughout the point of compliance. Note that where a cleanup action involves containment of soils with hazardous substance concentrations exceeding cleanup levels at the point of compliance, the cleanup action may be determined to comply with cleanup standards, provided the requirements specified in WAC 173-340-740(6)(f) are met.

Ecology did not make any changes to the guidance based on this comment.

Issue 6: Requiring additive risk adjustments where human exposure is unlikely will result in unnecessary cleanup effort and increase costs.

Comment:

Requiring cleanup levels to be adjusted to meet additive risk and noncancer hazard thresholds may result in a shift to excavation and off-site disposal as the preferred cleanup technology for many sites. When considering the long-term environmental impacts of a contaminant, destruction should be preferable to burying it in a landfill. This preference for destruction is reflected partially in the Permanence and Long-term effectiveness criteria of disproportionate cost analysis (DCA); however excavation can often be justified as ranking highly in these categories, which is not appropriate in my personal opinion.

Comment ID: 1-1

Response:

Ecology appreciates your support for the additive risk provisions in the MTCA rule, and we share your interest in ensuring our guidance clearly addresses contaminant fate and long-term sustainability of cleanup decisions.

First, enforcement of additive risk requirement does not predetermine the selection of excavation (removal) or any other cleanup option. Cleanup actions must meet all the requirements outlined in [WAC 173-340-360^{ix}](#), including the requirement that cleanup actions be permanent to the maximum extent practicable (PMEP). The cleanup action meeting those requirements could be treatment, removal, containment, or some combination of those options.

Applying the additive risk provision may, in some cases, lower cleanup levels potentially increasing the area or volume requiring remediation. While excavation (removal) could emerge as a preferred cleanup option at certain sites, this is not universally true. The use and extent of excavation is determined by site-specific factors, such as land and other resource uses, existing infrastructure, implementability, and other considerations. Increased excavation would also raise cleanup costs. So, this option must be carefully evaluated against other alternatives and must satisfy the PMEP requirement outlined in the cleanup rule. Ecology's PMEP guidance provides detailed directions on how to identify the cleanup option that uses permanent solutions to the maximum extent practicable.

Ecology acknowledges your concerns about long-term environmental implications of excavation and off-site disposal. As reflected in the rule's long-term effectiveness criterion destruction of contaminants is preferred over offsite disposal.

[Ecology did not make any changes to the guidance based on this comment.](#)

Issue 7: Include guidance on when additive risk adjustments or site-specific risk assessments are necessary.

Comment:

It is recommended that Ecology provide additional discussion/context as to when risk and hazard estimates should be presented, when a site-specific risk assessment is necessary, where in the site investigation process the adjustment should be considered, and when default cleanup levels are sufficient to make decision for a site.

Comment ID: 5-1

Response:

Sites that qualify for a Method A cleanup may be performed without consideration of additive effects due to multiple pathways of exposure, or due to multiple hazardous substances. Method A is for cleanups that are relatively straightforward and routine and is typically used at smaller sites that do not warrant the expense of completing detailed site studies. See Ecology's [*Guidance on the Use of Method A, B, and C Cleanup Levels and Mixing Methods*](#)¹² (Ecology, 2022).

Under Method B and C, whenever there are multiple chemicals and/or exposure pathways at a site, an evaluation of additive health effects in accordance with the procedures in [WAC 173-340-708](#)^v(5) and (6) should be presented to show compliance with a total excess cancer risk of one hundred thousand (1×10^{-5}) or a hazard index (HI) of one (1). Note that this excess cancer risk may also be expressed as 1E-05. This form of scientific notation (e.g., 1E-05) is used throughout the rest of the document.

A site-specific risk assessment may be conducted to help determine whether cleanup action alternatives, including those using a remediation level, engineered control and/or institutional control, are protective of human health and the environment ([WAC 173-340-357](#)^{vi}). The MTCA rule provides flexibility to allow cleanups to be addressed on a site-specific basis by allowing changes to some of the exposure factors in the MTCA cleanup level equations under Modified Methods B and C (based on chemical- or site-specific information), and utilizing the human health risk assessment framework procedures identified in WAC 173-340-708. Risk-based cleanup levels utilizing the MTCA equations are established using estimates of RME. RME is defined as the highest exposure that is reasonably expected to occur at a site. WAC 173-340-708(3) provides examples of when persons performing MTCA cleanup actions may want to consider using an alternate RME scenario to help assess the protectiveness to human health of a cleanup action alternative that incorporates remediation levels and uses engineered controls and/or institutional controls to limit exposure to the contamination remaining on the site. WAC 173-340-708(10) provides information on exposure parameters used in the MTCA risk-based equations including those that may be changed where there is adequate scientific data to demonstrate that use of an alternative or additional value would be more appropriate for the conditions present at the site. Note that more stringent cleanup standards than those derived under our default RME exposure scenarios may be required (e.g., via site-specific risk assessment) where, based on a site-specific evaluation, Ecology determines that this is necessary to protect human health and the environment (e.g., see WAC 173-340-708(10)(b); [WAC 173-340-740](#)^{viii}(1)(c)). Any proposed change to the default RME scenario or exposure parameters provided in the MTCA rule should be made in coordination with the Ecology site manager.

¹² https://www.ezview.wa.gov/Portals/_1987/Documents/Documents/MixingMethodsABC.pdf

Adjustments based on cumulative risk and noncancer hazard are usually done as part of the feasibility study (FS) (or at the end of the remedial investigation [RI]) when identifying final cleanup levels for chemicals of concern (COCs).

[Ecology did not make any changes to the guidance based on this comment.](#)

Issue 8: Clarify position on the use of maximum contaminant levels (MCLs) and their sufficiency for protection of human health.

Comment:

Please clarify Ecology's position regarding safe drinking water act maximum contaminant levels (MCLs) sufficiency for protection of human health. Based on statements in the guidance document (pg. 35), the MCL has been developed and recommended for use for potable water systems because the MTCA value cannot be reached. If the policy decisions is not relevant to selection of cleanup levels, at what point of the cleanup process will the technical or analytical limitations be considered in the cleanup process?

Comment ID: 5-2

Response:

Ecology utilizes applicable state and federal laws (e.g., MCLs) to establish cleanup levels for individual substances except for situations where the use of such levels would result in a total site cancer risk greater than 1E-05 or an HI greater than 1. Applicable state and federal laws are also referred to as Applicable or Relevant and Appropriate Requirements (ARARs). Where these limits are exceeded, cleanup levels more stringent than ARARs will be required (see [WAC 173-340-705](#)ⁱⁱⁱ(5); [WAC 173-340-706](#)^{iv}(6)). This is consistent with the MTCA statutory requirement to establish "minimum cleanup standards" at least as stringent as ARARs ([RCW 70A.305.030](#)^x(2)(e)). More information on the question of whether it is appropriate to establish cleanup requirements that are more restrictive than recognized and promulgated human health and environmental protection standards is addressed on Page 36 (see Issue #2) of Ecology's [Responsiveness Summary for the Amendments to the Model Toxics Control Regulation, Chapter 173.-340 WAC](#)¹³ (Ecology, 1991).

Analytical limitations are considered in cases where risk-based levels are below the PQL (see discussion in Issues 1 and 2).

Technical or analytical limitations, as described in the comment, can be considered for evaluating if a site qualifies for Method C groundwater cleanup levels (see [WAC 173-340-706](#)^{iv}(a)). This evaluation may typically be conducted during the FS. Method C is a conditional

¹³ <https://apps.ecology.wa.gov/publications/SummaryPages/9109918.html>

method and may be used to establish cleanup levels for potable groundwater at a site where it can be demonstrated that such levels comply with ARARs, that all practicable methods of treatment have been used (to minimize releases to the groundwater and to restore the groundwater), that institutional controls are in place, and that one or more of the following conditions exist:

- The Method A or B cleanup levels are below technically possible concentrations;
- The Method A or B cleanup levels are below area background concentrations; or
- The attainment of Method A or B cleanup levels has the potential for creating a significantly greater overall threat to human health or the environment than attainment of Method C cleanup levels.

Note that the requirement for Method C cleanup levels to comply with ARARs means Method C groundwater cleanup levels will be the same as Method A or B in many cases.

[Ecology did not make any changes to the guidance based on this comment.](#)

Issue 9: Include more discussion on the importance of a conceptual site model (CSM) to inform cleanup levels.

Comment:

A more robust discussion of a conceptual site model (CSM) should be included that better explains relevant migration/transport pathways for contaminants at the site, and which pathways are complete/incomplete, significant/insignificant, and directly influence cleanup levels. The CSM is an important tool to determine when and if a site-specific risk assessment may be warranted before automatically reducing cleanup levels. As currently written, the document implies that the CSM is not needed in the development and/or selection of cleanup levels. Instead, the document implies that if the number of contaminants is sufficiently low (e.g., 15 carcinogens), the Method B criteria can be selected as cleanup levels and additional considerations are not necessary. It's recommended that the guidance includes language to consider the CSM (in consultation with the Ecology site manager) before cleanup levels are adjusted solely because cumulative risk or hazard thresholds are exceeded.

Comment IDs: 4-2 and 5-3

Response:

Ecology recognizes the importance of a robust CSM to guide the RI and for the development of appropriate cleanup levels at a site. Note that the MTCA rule emphasizes the importance of a CSM in conducting an RI (see [WAC 173-340-350](#)^{xi} (7)(b)(ii)), developing cleanup levels (see [WAC 173-340-700](#)ⁱⁱ(5); WAC 173-340-700(8)(ii)), and for evaluating RME (see [WAC 173-340-](#)

[708^v\(3\)\(e\)\)](#). Step 4 of the process outlined in Chapter 5.3 specifies that all relevant transport and exposure pathways must be considered when setting the cleanup level.

[Additional discussion on the importance of a CSM will be included in Chapter 5.3 of the guidance.](#)

Issue 10: Provide more discussion in the guidance on factors used for contaminant screening and selection of cleanup levels.

Comment:

The guidance document is focused on the presence or absence of a constituent(s) as the only factor in selection of a cleanup level, or additive chemicals for concurrent exposures. However, the conceptual site model (CSM) for the site greatly impacts the relevant cleanup levels as suggested in this same document and could be subtractive. Please provide additional discussion in the document as to the role of the following items in determining a cleanup level:

- The remedial investigation and/or other investigation efforts;
- The CSM;
- The frequency of detection;
- The frequency of exceedance; and
- The results of a site-specific risk assessment.

Comment ID: 5-4

Response:

Ecology recognizes that cleanup levels are not required to be established for all hazardous substances found at a site. Under MTCA, there is flexibility to identify “indicator hazardous substances” (see [WAC 173-340-703^{xii}](#); [WAC 173-340-708^v\(2\)](#)). More specifically, when defining cleanup requirements at a site that is contaminated with a large number of hazardous substances, those hazardous substances that contribute a small percentage of the overall threat to human health and the environment may be considered for elimination. Note that identifying indicator hazardous substances at a site using the approach in WAC 173-340-703 should be made in coordination with the Ecology site manager.

The frequency of detection and frequency of exceedance do not impact the cleanup level but could be considered when identifying indicator hazardous substances in coordination with the Ecology site manager. The CSM is an important tool in identifying all relevant transport and exposure pathways for the development of protective cleanup levels. Site-specific risk assessments may be conducted under MTCA as described in our responses to Issues 4 and 7.

[Additional discussion on the importance of a CSM \(as discussed in Issue 9\) and on the approach for selecting indicator hazardous substances will be included in Chapter 5.3 of the guidance.](#)

Issue 11: Include relevant ecological risk guidance and cleanup criteria.

Comment:

Please include relevant ecological risk guidance and cleanup criteria within the document and how they influence adjustment of Method B and Method C cleanup criteria. The guidance provides a preference for leaching based values as the basis of cleanup levels. We assume that the preference would also apply to cleanup levels based on ecological endpoints (e.g., leaching to groundwater and protection of surface water based on an ecological endpoint or protection of terrestrial wildlife).

Comment ID: 5-5

Response:

Based on the CSM, cleanup levels should be identified for all relevant transport and exposure pathways. For soil, in addition to human direct contact, the leaching pathway should be evaluated based on estimates of the highest beneficial use of groundwater at the site under both current and potential future site use conditions. In general, [WAC 173-340-720](#)^{vii} requires that groundwater cleanup levels be set at concentrations that protect for drinking water beneficial uses, unless the groundwater qualifies as nonpotable (see WAC 173-340-720(2)). WAC 173-340-720 also requires groundwater cleanup levels to be protective of surface water beneficial uses unless it can be demonstrated that the hazardous substances in the groundwater are not likely to reach surface water. For sites that are adjacent to or near surface water, the exposure pathway of concern is the discharge of contaminated groundwater into the surface water and the protection of aquatic organisms living in that surface water and sediment, and persons that consume those organisms. Ecology's CLARC database includes default soil leaching levels based on protection of drinking water and protection of groundwater that discharges to fresh or marine surface water. Additional information on the soil leaching pathway is found in our CLARC guidance titled [Soil Cleanup Levels to Protect Groundwater](#)¹⁴ (Ecology, 2021).

A terrestrial ecological evaluation (TEE) for evaluating potential impacts on upland plants, soil biota, and wildlife must be conducted if hazardous substances are released to soil at a site. Note that it's common for some sites in urban areas to meet one of the TEE exclusions provided in the MTCA rule (see [WAC 173-340-7491](#)^{xiii}), ending the TEE process. If the site does not qualify for an exclusion, the selected TEE level may, in some cases, be lower than levels based on human health protection. In these cases, the TEE may be identified as the minimum cleanup

¹⁴

https://www.ezview.wa.gov/Portals/_1987/Documents/Documents/SoilCleanupLevelsToProtectGroundwater.pdf

level for the site. For additional information, see Ecology's [TEE webpage and TEE form](#)¹⁵. Once the minimum cleanup level is determined, it is evaluated for additive cancer risk and noncancer hazard for human health.

[Additional discussion on accounting for concentrations based on protection of terrestrial ecological receptors will be included in Chapter 5.3 of the guidance.](#)

Issue 12: Clarify the use of Method A values when using Method B or C and when those values may need to be adjusted to account for additive risk.

Comment:

Footnote 2 on page 7 says that if a Method A cleanup level is being used under Method B, the Method A value may need to be adjusted downward to account for additive cancer risk and/or noncancer hazard. Can Ecology clarify the intent of the adjustment for Method A values in the footnote and specify how this adjustment should be done and for which exposure routes/exposure pathways the adjustment of Method A values should apply? For example, TPHs do not have Method B values available in CLARC. Is the expectation that Method B calculations are necessary?

Comment IDs: 5-6 and 5-8

Response:

In general, Method A cleanup levels may be used under Method B or C in the following cases.

- A Method B or C value isn't available.
- You're accounting for applicable state and federal laws (a.k.a., ARARs).
- The Method A level is based on natural background.

Below are some examples of when it may be appropriate to use a Method A level under Method B or C, and whether it should be considered for downward adjustment based on compliance with MTCA's thresholds for additive risk and noncancer hazard.

- **Arsenic in soil and groundwater.** Method A arsenic levels for soil and groundwater have been adjusted for natural background. Cleanup levels based on natural background do not need to be included in the additive risk and noncancer hazard evaluation. Note that Method A values based on natural background need to be examined for applicability at a specific site based on site-specific information as discussed on Page 105 of our February 2001 [Concise Explanatory Statement for the Amendments to the Model Toxics Control Act \(MTCA\) Cleanup Regulations](#)¹⁶ (Ecology, 2001).

¹⁵ <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/terrestrial-ecological-evaluation>

¹⁶ <https://apps.ecology.wa.gov/publications/summarypages/0109043.html>

- **Lead in soil and groundwater.** Cleanup levels for lead in soil and groundwater do not need to be included in the additive risk and noncancer hazard evaluation. Method B and C calculated lead soil and groundwater cleanup levels are not available (using MTCA equations) due to the lack of an established reference dose (RfD). As a result, a traditional hazard quotient (HQ; i.e., exposure intake divided by the RfD) cannot be calculated for lead. Rather, Method A lead soil cleanup levels are based on preventing unacceptable blood lead levels, and the Method A groundwater cleanup is based on its federal level as defined in 40 CFR 141.8.
- **Total Polychlorinated Biphenyls (PCBs) in soil.** The Method A levels for total PCBs in soil are based on requirements in the Toxic Substances Control Act (TSCA), which is an applicable federal law (a.k.a., ARAR). These levels by themselves are considered sufficiently protective under MTCA since they are associated with no more than an excess cancer risk of 1E-05. However, combined with other carcinogenic chemicals of concern at a Method B or C site, these levels may need to be adjusted downward to meet the maximum acceptable level of total site risk under MTCA (i.e., 1E-05).
- **Total Petroleum Hydrocarbons (TPH) in soil and groundwater.** Method A TPH levels in soil and groundwater may be used where site-specific Method B or C TPH levels have not been derived. These can be applied at Method B or C sites as a default and do not need to be included in the cumulative risk and noncancer hazard evaluation based on human direct contact. Rather, the cumulative risk and noncancer hazard evaluation is based on the individual petroleum components in soil and groundwater such as BTEX (i.e., benzene, toluene, ethylbenzene, xylenes), fuel additives, carcinogenic polycyclic aromatic hydrocarbons (PAHs), and others. Chapter 7 of Ecology's [*Guidance for Remediation of Petroleum Contaminated Sites*](#)¹⁷ provides information on required testing for common petroleum products encountered at contaminated sites (Ecology, 2016; also see MTCA Rule Table 830-1).
- Note that on a site-specific basis, Ecology may require cleanup levels that are more stringent than the Method A TPH levels to protect human health or the environment. For example, the Method A TPH cleanup levels do not consider vapor hazards or surface water and sediment impacts. If these are issues at a site, cleanup levels may need to be lower than Method A.

For additional information on the use of Method A levels, see Ecology's [*Guidance on the Use of Method A, B, and C Cleanup Levels and Mixing Methods*](#)¹⁸ (Ecology, 2022).

Ecology did not make any changes to the guidance based on this comment.

¹⁷ <https://apps.ecology.wa.gov/publications/SummaryPages/1009057.html>

¹⁸ https://www.ezview.wa.gov/Portals/_1987/Documents/Documents/MixingMethodsABC.pdf

Issue 13: Clarify the use of soil leaching to groundwater values in the additive risk evaluation.**Comment:**

Does Ecology expect that migration to groundwater/leaching values will always be included in the cumulative risk and target organ HI adjustments for cleanup levels? Based on the “Note” box on page 10, it appears that Ecology prefers the selection of these endpoints and then the adjustment of the additive risk is no longer necessary for consideration.

Comment ID: 5-7

Response:

When establishing a soil cleanup level, consider all transport and exposure pathways relevant to the site (based on the CSM) and use the minimum value (see Chapter 5.3 of the guidance). If the minimum value falls below natural background or the PQL, adjust up as necessary (see our response in Issues 1 and 2 related to CULs based on natural background or PQL). In many cases, inclusion of the leaching pathway results in cleanup levels that don’t need to be adjusted for additive cancer risk or noncancer hazard, but you should always check to make sure.

[The approach for considering natural background and the PQL in setting and adjusting CULs will be included in Chapter 5.3 of the final guidance.](#)

Issue 14: Provide more guidance on how to apportion additive risk when performing downward adjustments from multiple hazardous substances.**Comment:**

Page 8 of the guidance says “...that for the purposes of establishing cleanup levels under Methods B and C, exposure to multiple hazardous substances may be apportioned between hazardous substances in any combination as long as the total excess cancer risk does not exceed 1E-05 and noncancer hazards (i.e., HI) do not exceed 1”.

- Please provide guidance for readers as to reasons/justifications that can be used to apportion the “excess risk” and “excess hazard” in the adjustment process. For example, is it advisable to apportion the “adjustments” for hazardous substances in a manner that is supported by technically defensible lines of evidence and based on the CSM (e.g., detected concentrations and their distribution in site media, complete/incomplete exposure pathways).
- As Ecology gains experience implementing this guidance, we encourage the Department to periodically evaluate how decisions to apportion risk and noncancer hazard are being applied in practice and use that experience to develop additional implementation resources such as:
 - additional worked examples and case studies;

- best practices developed from implementation experience;
- practitioner training opportunities; and,
- updates to the CLARC workbook that incorporate the additive risk and hazard adjustment equations and calculation procedures described in the guidance

Providing these resources will improve transparency, reduce calculation errors, and promote more consistent implementation across cleanup sites.

Comment IDs: 4-3 and 5-9

Response:

[WAC 173-340-708](#)⁽⁵⁾ of the MTCA rule says that for the purposes of establishing cleanup levels under Methods B and C, and for remediation levels, the cancer risks and noncancer hazards resulting from exposure to multiple hazardous substances may be apportioned between hazardous substances in any combination as long as the total excess cancer risk does not exceed 1E-05 and the hazard index does not exceed 1. As such, Ecology does not have a set preference on how downward adjustments are made and recognizes that it's a site-specific decision based in part on the affected media, the concentration distribution of COCs, proposed points of compliance, and in consideration of the remedial action objectives and their compliance with MTCA. A few suggestions to consider when making decisions on risk apportionment are provided below.

- If it is determined that a certain carcinogen at a site is easier to clean up than other co-located contaminants (e.g., its nature and extent is limited to shallower soil depths that are easier to excavate or it's less mobile), you may want to target that carcinogen for downward adjustment to a lower cleanup level.
- If the cumulative risk or noncancer hazard level is exceeded, a potential strategy may be to target cumulative risk adjustment for those COCs that exceed cleanup levels, as a response action is already triggered for these COCs.
- If it is determined that some COCs exceeding cleanup levels are difficult to clean up, an option may be to target cumulative risk adjustment on those COCs which can more easily be remediated even though they may contribute less to the total site risk. This approach may leave more risk or hazard available for those COCs that are difficult to remediate.

The information above will be incorporated into Chapter 1 of the guidance. Also, as more experience is gained, Ecology will consider periodically updating this guidance with any new methods or rationale for making total site risk adjustments at sites.

Issue 15: Provide more discussion in the guidance on factors used for contaminant screening such as those included in EPA's Risk Assessment Guidance for Superfund (RAGS).

Comment:

The United States Environmental Protection Agency's (EPA's) Risk Assessment Guidance for Superfund (RAGS) includes a screening step to focus evaluation in remedial investigations on those chemicals of potential concern (COPCs) that contribute the greatest risk and/or hazard. Under MTCA, is just the presence/suspected presence of a constituent (or class of constituents) enough to include it as a COPC? Please provide context or explanation as to the applicability of a concentration-based screening (i.e., screening for COPCs) as part of the evaluation of cumulative risk and noncancer hazard under MTCA. Also, please clarify if the CSM can be used to limit the number of constituents considered for further evaluation as part of a site investigation.

Comment IDs: 5-10 and 5-15

Response:

As discussed in Issue 10, cleanup levels are not required to be established for all hazardous substances found at a site. MTCA cleanups also incorporate a screening step as part of the RI which can be used to identify indicator hazardous substances (also known as COPCs). Through site screening, those hazardous substances that are determined to contribute only a small percentage of the overall threat to human health and the environment may be eliminated (see [WAC 173-340-703^{xii}](#)). Development of a CSM as discussed in Issues 3 and 9 is used to guide the RI and for the development of appropriate preliminary cleanup levels (same as screening levels) at a site. For site risk-based screening and selection of COPCs under Methods B and C, Ecology recommends using a 1E-06 cancer risk for carcinogens, and a HQ of 0.1 for noncarcinogens (similar to EPA Superfund Guidance).

[Additional discussion on the importance of a CSM \(as discussed in Issue 9\) and on the approach for selecting indicator hazardous substances will be included in Chapter 5.3 of the guidance.](#)

Issue 16: Clarify the phrase, “15 carcinogens are present...” in the additive risk example in Section 1.1.

Comment:

On page 9, the guidance states that if 15 carcinogens are present at their respective cancer-based cleanup level (i.e., 1E-06 risk), and adjust to cleanup levels is necessary as the total risk exceeds 1E-05. Please clarify the intent of the term “present” for the carcinogenic and hazard adjustment. Is the intent to indicate that there are 15 carcinogens present or is that there are 15 carcinogens that have been identified as contaminants of concern for a site?

Comment ID: 5-13

Response:

This is a hypothetical example to illustrate that 15 carcinogens at an excess cancer risk level of one in a million (i.e., 1E-06) will result in an exceedance of the total site excess cancer risk threshold of 1E-05.

The text in Chapter 1.1 will be clarified that the 15 carcinogens have been identified as COCs.

Issue 17: Clarify significant figure rounding and compliance requirements for both individual chemicals and when considering cumulative risk.

Comment:

The guidance indicates that cleanup levels derived using MTCA equations are rounded to two significant figures, whereas the results for cumulative risk and noncancer hazard are rounded to one significant figure. Can a site meet cleanup standards in cases where concentrations exceed individual risk-based cleanup levels (at two significant figures) but not the target cumulative risk or noncancer hazard thresholds (at one significant figure)?

Comment ID: 5-14

Response:

Cleanup standards are not met in cases where concentrations exceed individual risk-based cleanup levels, but the total site risk is in compliance. Under MTCA, compliance with target excess cancer risk and noncancer hazard goals is required for both individual hazardous substances and for combined (additive) impacts. As discussed in Chapter 3 of the guidance, it's important to note that calculation of forward cancer risks and HQs based on exposure concentrations in site media should not be used to determine compliance for individual chemicals. For example, if soil concentrations for an individual carcinogen generate a cancer risk of 1.3E-06, one would not round this to one significant figure and conclude that it meets the MTCA Method B individual risk-based goal of 1E-06. In this case, compliance is determined by comparing site soil concentrations to the Method B cleanup level which is based on a 1E-06 excess risk level (see [WAC 173-340-740](#)^{viii}(7) for soil compliance monitoring methods).

Ecology did not make any changes to the guidance based on this comment.

Issue 18: Provide guidance on summation parameters (e.g., cPAHs and dioxins/furans) in making additive risk adjustments.

Comment:

Can Ecology please provide guidance on how summation parameters (e.g., cPAHs and dioxins/furans) should be considered when accounting for cumulative risk and target organ HI? How will the adjustment work when there are overlapping chemicals within a summation parameter (e.g., high molecular weight PAHs and cPAHs)?

Response:

Ecology uses toxicity equivalence factors (TEFs) to evaluate the toxicity and assess the risks for environmental mixtures of dioxins/furans and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) (see [WAC 173-340-708^v](#)(8)(d) and (e)). A TEF is an estimate of the toxicity of a chemical relative to that of a reference chemical. For cPAHs, the reference chemical is benzo(a)pyrene and for dioxins/furans it's 2,3,7,8-TCDD.

TEFs are used to convert chemical concentrations of these mixtures in site media to a total toxic equivalent concentration or TEQ. The calculated TEQ is then compared to the appropriate cleanup level identified for the reference chemical. Cleanup levels for the reference chemicals may need to be adjusted downward when evaluating additive impacts from other chemicals (i.e., those not included in these mixtures) or exposure pathways.

Guidance on evaluating dioxin/furan and cPAH mixtures is found in our 2007 document titled [Evaluating the Toxicity and Assessing the Carcinogenic Risk of Environmental Mixtures Using Toxicity Equivalency Factors¹⁹](#) (Ecology, 2007) and in our [Implementation Memo #10²⁰](#) (Ecology, 2015).

The summation of low molecular weight PAHs (LPAHs) and high molecular weight PAHs (HPAHs) are evaluated based on toxicity to marine benthic organisms under our Sediment Management Standards (SMS; [WAC 173-204^{xiv}](#)) but not under MTCA.

For human health under SMS and MTCA, cPAHs should be included in the calculation of a TEQ and a cleanup level should be established for cPAH TEQ, which might need to be adjusted for additive cancer risk. The noncarcinogenic PAHs should have individual cleanup levels, which might need to be adjusted for additive noncancer hazard.

Example 1 in the guidance will be updated to reflect that 2,3,7,8-TCDD is evaluated using TEFs.

Issue 19: The ARAR adjustment (in Section 5.5, Example 2) discussed for PCBs in soil contradicts the information provided in Example 2 for MCL-based ARARs.

Comment:

The text related to the ARAR-based soil cleanup levels for PCBs (see Footnote 25 of the guidance) contradicts the information provided in Example 2 for MCL-based ARARs. If the ARAR-based PCB soil level with a cancer risk above 1E-06 is considered protective (as stated in

¹⁹ https://www.ezview.wa.gov/Portals/_1987/Documents/Documents/UsingToxicityEquivalencyFactors2007.pdf

²⁰ <https://apps.ecology.wa.gov/publications/SummaryPages/1509049.html>

Footnote 25 of the guidance), why are MCLs with a cancer risk above 1E-06 for trichloroethylene (TCE) and vinyl chloride (VC) not considered protective of human health?

Comment ID: 5-17

Response:

ARARs (e.g., MCLs) for an individual chemical are considered sufficiently protective under MTCA if they are less than or equal to an excess cancer risk of 1E-05 or an HQ of 1. However, ARAR-based cleanup levels may need to be adjusted downwards so that the total site risk does not exceed an excess cancer risk of 1E-05, and the noncancer HI does not exceed 1 (see [WAC 173-340-705](#)ⁱⁱⁱ(5); [WAC173-340-706](#)^{iv}(6)).

The Method A levels for total PCBs in soil are based on requirements in the Toxic Substances Control Act (TSCA), which is an applicable federal law. These levels by themselves are considered sufficiently protective under MTCA since they are associated with no more than an excess cancer risk of 1E-05. However, combined with other carcinogenic chemicals of concern at a Method B or C site, these levels may need to be adjusted downward to meet the maximum acceptable level of total site risk under MTCA (i.e., 1E-05).

The MCL for TCE generates a cancer risk of 9.3E-06 and a noncancer HQ of 1.3. Although its cancer risk is less than 1E-05, its HQ is greater than 1. Therefore, the MCL for TCE is not sufficiently protective of its noncancer endpoint.

The MCL for VC generates a cancer risk of 6.9E-05 and an HQ of 0.08. In this case, its cancer risk exceeds 1E-05 and its HQ is less than 1. Therefore, the MCL for VC is not sufficiently protective of its cancer endpoint.

Ecology did not make any changes to the guidance based on this comment.

Issue 20: Clarify the difference between Method A TPH table values and site-specific Method B or C values using MTCA equations. Under Methods B or C, should the additive site risk account for TPH?

Comment:

Please clarify Ecology's use of Equations 740-3/745-3 (soil) and 720-3 (groundwater) for TPH versus use of the TPH Method A values provided in the Cleanup levels and Risk Calculation (CLARC) tables? For sites evaluated under Methods B and/or C, should the calculated cumulative risk and target organ HI account for TPH concentrations at a site? Or should TPH calculations be kept separate from individual chemical calculations?

Comment ID: 5-18

Response:

The MTCA equations referenced in the question are used under Methods B and C to calculate site-specific cleanup levels for petroleum mixtures (i.e., TPH). If Methods B or C are used to develop site-specific cleanup standards for TPH, then fractionated product testing will be necessary using the volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) methods to determine the concentration of aliphatic and aromatic hydrocarbons in specific carbon ranges or fractions. If Method A is used to develop cleanup standards (based on a default petroleum composition), then whole product analysis, using the NWTPH-Gx and/or NWTPH-Dx methods should be used to determine the concentration of gasoline range compounds (Gx) or diesel and oil range compounds (Dx) present in a sample.

Method A TPH levels in soil and groundwater may be used where site-specific Method B or C TPH levels have not been derived. These can be applied at Method B or C sites as a default and do not need to be included in the cumulative risk and noncancer hazard evaluation based on human direct contact with soil or ingestion of groundwater (see Response to Issue 12).

Under MTCA Methods B and C, for noncarcinogenic effects of petroleum mixtures, a TPH cleanup level shall be calculated taking into account the additive effects of the petroleum fractions (i.e., using EPH and VPH data) and individual volatile organic compounds present in the petroleum mixture (see [WAC 173-340-740](#)^{viii}(3)(b)(iii)(B)(III)). Individual volatile organic compounds in the petroleum mixture may typically include petroleum related compounds such as BTEX, fuel additives, and PAHs (see MTCA Table 830-1). Ecology's [MTCATPH Workbook Version 12.0](#)²¹ is a tool that may be used to calculate Method B and/or Method C cleanup levels for petroleum mixtures in soil and groundwater based on protection of human health and the environment. Also see guidance provided in Chapter 8 of our [Guidance for Remediation of Petroleum Contaminated Sites](#)²² (EPA, 2016) and our CLARC guidance on [Calculation of Method B and Method C Cleanup Levels for Petroleum Mixtures](#)²³ (Ecology, 2023).

Due to the complexity of deriving site-specific TPH cleanup levels (based on noncancer effects) under Methods B and C, Ecology recommends making this calculation using our MTCATPH Workbook tool. This tool accounts for the noncancer effects of the petroleum fractions (i.e., using EPH and VPH data) and individual volatile organic compounds present in the petroleum mixture (see MTCA Table 830-1). For the purpose of calculating the site-specific TPH level, the noncancer effects from the petroleum mixture are conservatively assumed to be additive—due to the wide range of chemicals and potential health effects posed by the various fractions (Ecology, 2024). Due to the complexities discussed above including Ecology's assumption that

²¹ <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-cleanup-tools/petroleum-cleanup-tools>

²² <https://apps.ecology.wa.gov/publications/SummaryPages/1009057.html>

²³ <https://fortress.wa.gov/ecy/ezshare/tcp/CLARC/CalcOfMethB&CTPHCULs.pdf>

noncancer effects from the petroleum mixture are additive (i.e., we don't recommend trying to segregate noncancer effects by target organ for fractionated data), the site-specific Method B or C TPH level calculated by the MTCATPH workbook tool does not need to be included in the noncancer total site hazard evaluation. This is consistent with the methods for deriving site-specific Method B and C TPH levels provided in our 2016 [Guidance for Remediation of Petroleum Contaminated Sites](#)²⁴ (see Figure 8.1 in Ecology, 2016).

Known or suspected carcinogenic chemicals that contribute to unacceptable risk within the petroleum mixture as calculated in the MTCATPH workbook tool are evaluated separately and must meet compliance with soil and groundwater cleanup standards both on an individual basis and when accounting for cumulative risk from multiple chemicals and pathways at the site. For soil, cleanup levels for other carcinogens within the petroleum mixture shall be calculated using MTCA Equation 740-5 (based on concurrent exposure to soil via incidental ingestion and dermal contact). For groundwater as a potable drinking water source, cleanup levels for other carcinogens within the petroleum mixture shall be calculated using MTCA Equation 720-2. Note that the cancer risk contribution from carcinogens present within the petroleum mixture but not included in the workbook tool need to be included in the total site risk evaluation. This may be done separately outside of the workbook tool using the methods provided in the guidance.

Ecology did not make any changes to the guidance based on this comment.

Issue 21: When should one use exposure factors from MTCA versus those in SMS? What is the prioritization?

Comment:

Are the exposure factors provided in these tables prioritized over other relevant guidance from Ecology (e.g., Sediment Cleanup User's Manual, Water Quality Standards for Surface Waters of the State of Washington Chapter 173-201A WAC)? Are there prioritization preferences from Ecology on which exposure factors should be used? Please provide guidance and rationale as to what is considered a reasonable maximum exposure (RME) scenario when there are multiple guidance documents that present different scenarios and values.

Comment ID: 5-19

Response:

When developing soil, groundwater, surface water, and air cleanup levels for MTCA cleanup sites, use the equations in the MTCA rule ([WAC 173-340^{xv}](#)). The equations in the rule specify the

²⁴ <https://apps.ecology.wa.gov/publications/summarypages/1009057.html>

RME values for exposure parameters. The risk-based Method B and C calculated cleanup levels in CLARC and the equations in **Attachment A** of this guidance are consistent with the equations in MTCA. When developing sediment cleanup levels for MTCA cleanup sites, apply the [*Sediment Management Standards*](#)²⁵ ([WAC 173-204](#)^{xiv}) along with the equations and exposure parameters provided in our [*Sediment Cleanup User's Manual \(SCUM\)*](#)²⁶ (Ecology, 2025). Appendix K of SCUM contains an excel workbook tool for calculating risk-based concentrations for sediment and tissue.

For MTCA cleanup sites that are located within a usual and accustomed fishing area for one or more tribes, it may be necessary to use a site-specific fish consumption rate for calculating surface water and sediment cleanup levels for the protection of human health (see [WAC 173-340-708](#)^v(10)(b); SCUM guidance Table 9-4). Consult with the tribe(s) to determine the appropriate fish consumption rate.

Ecology did not make any changes to the guidance based on this comment.

Issue 22: How do you approach total site risk when you may have one type of source and chemical release as opposed to multiple unrelated sources and contaminants?

Comment:

We would like to understand better how additive risk and hazard evaluations are performed for sites with only one type of source and chemical release (e.g., UST) versus a site with multiple unrelated sources and contaminants (from different current and historical activities). Conceptual site models and exposure scenarios can be fundamentally different depending on the type of source and release. For example, a release from a single petroleum UST typically contains multiple related petroleum constituents that originate from the same release mechanism, migrate through the same environmental media, and are evaluated using a common conceptual site model. This is a different scenario than a site with multiple unrelated sources and contaminants from different current and historical industrial activities, release mechanisms, and exposure pathways. Similarly, petroleum releases are already evaluated using additive approaches within existing petroleum guidance. As a result, automatically applying additional downward adjustments without considering the overall site conditions could result in cleanup requirements that are more conservative than necessary to achieve MTCA's protective objectives.

Comment ID: 4-1

Response:

²⁵ <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/sediment-cleanup-resources>

²⁶ <https://apps.ecology.wa.gov/publications/SummaryPages/1209057.html>

A conceptual site model (CSM) that describes release mechanisms from sources of hazardous substances, the exposure media and routes (e.g., ingestion), and the potential receptors should be developed as part of the site investigation. Based on the CSM, sites with multiple unrelated sources and hazardous substances may need to be divided into separate exposure units (EUs) for establishing cleanup standards. See discussion on EUs in Issue 3.

[Ecology did not make any changes to the guidance based on this comment.](#)

Issue 23: There are “Error! Bookmark not defined” errors in the provided links.

Please remove or adjust the links to resolve the errors.

Comment ID: 5-20

Response:

[Thank you for pointing this out. This will be corrected in the final version of the guidance.](#)

References

- Ecology. 1991. Responsiveness Summary for the Amendments to the Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC. Publication No. 91-09-918.
<https://apps.ecology.wa.gov/publications/SummaryPages/9109918.html>
- Ecology, 1992. (revised August 1993). Statistical Guidance for Ecology Site Managers. Publication No. 92-54.
<https://apps.ecology.wa.gov/publications/summarypages/9254.html>
- Ecology, 2001. Concise Explanatory Statement for the Amendments to the Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC. Publication Number: 01-09-043.
<https://apps.ecology.wa.gov/publications/summarypages/0109043.html>
- Ecology, 2007. Evaluating the Toxicity and Assessing the Carcinogenic Risk of Environmental Mixtures Using Toxicity Equivalency Factors.
https://www.ezview.wa.gov/Portals/_1987/Documents/Documents/UsingToxicityEquivalencyFactors2007.pdf
- Ecology, 2015. Implementation Memorandum #10: Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) using Toxicity Equivalency Factors (TEFs).
<https://apps.ecology.wa.gov/publications/documents/1509049.pdf>
- Ecology, 2016. Guidance for Remediation of Petroleum Contaminated Sites. Toxics Cleanup Program. Publication No. 10-09-057.
<https://apps.ecology.wa.gov/publications/summarypages/1009057.html>
- Ecology, 2021. Soil Cleanup Levels to Protect Groundwater. Supporting materials for Cleanup Levels and Risk Calculation.
https://www.ezview.wa.gov/Portals/_1987/Documents/Documents/SoilCleanupLevelsToProtectGroundwater.pdf
- Ecology, 2022. Guidance on the Use of Method A, B, and C Cleanup Levels and Mixing Methods. Supporting materials for Cleanup Levels and Risk Calculation.
https://www.ezview.wa.gov/Portals/_1987/Documents/Documents/MixingMethodsABC.pdf
- Ecology, 2023. Calculation of Method B and Method C Cleanup Levels for Petroleum Mixtures. Supporting materials for Cleanup Levels and Risk Calculation.
<https://fortress.wa.gov/ecy/ezshare/tcp/CLARC/CalcOfMethB&CTPHCULs.pdf>
- Ecology, 2024. Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Supporting materials for Cleanup Levels and Risk Calculation.
<https://fortress.wa.gov/ecy/ezshare/tcp/CLARC/ToxicityChemPropPetroleumMixtures.pdf>

Ecology, 2025. Sediment Cleanup User's Manual (SCUM). Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC. Publication No. 12-09-057.

<https://apps.ecology.wa.gov/publications/SummaryPages/1209057.html>

Appendix A: Index of Public Comments

Table 1 below shows the number (#) and name of each commenter, their affiliation, and the date their comments were received. The table also breaks down each comment ID and corresponding issue number where Ecology provided a response.

Table 1: Index of commenter information

#	Name	Affiliation	Date	Comment ID	Issue #s
2	Jerome Cruze	Individual	6/16/2026	2-1	1
5	Grant Walter	Individual	6/29/2026	5-11	1
5	Grant Walter	Individual	6/29/2026	5-12	2
2	Jerome Cruze	Individual	6/16/2026	2-2	3
3	Mark Adams	Individual	6/26/2026	3-1	4
6	Anonymous	Individual	6/26/2026	6-1	5
1	Jonathan Cronk	Individual	5/28/2026	1-1	6
5	Grant Walter	Individual	6/29/2026	5-1	7
5	Grant Walter	Individual	6/29/2026	5-2	8
4	Jessica Spiegel	WSPA	6/26/2026	4-2	9
5	Grant Walter	Individual	6/29/2026	5-3	9
5	Grant Walter	Individual	6/29/2026	5-4	10
5	Grant Walter	Individual	6/29/2026	5-5	11
5	Grant Walter	Individual	6/29/2026	5-6	12
5	Grant Walter	Individual	6/29/2026	5-8	12
5	Grant Walter	Individual	6/29/2026	5-7	13
4	Jessica Spiegel	WSPA	6/26/2026	4-3	14
5	Grant Walter	Individual	6/29/2026	5-9	14
5	Grant Walter	Individual	6/29/2026	5-10	15
5	Grant Walter	Individual	6/29/2026	5-15	15
5	Grant Walter	Individual	6/29/2026	5-13	16
5	Grant Walter	Individual	6/29/2026	5-14	17
5	Grant Walter	Individual	6/29/2026	5-16	18
5	Grant Walter	Individual	6/29/2026	5-17	19

#	Name	Affiliation	Date	Comment ID	Issue #s
5	Grant Walter	Individual	6/29/2026	5-18	20
5	Grant Walter	Individual	6/29/2026	5-19	21
4	Jessica Spiegel	WSPA	6/26/2026	4-1	22
5	Grant Walter	Individual	6/29/2026	5-20	23

Appendix B: Public Comments

This appendix shows the public comments received by Ecology. The assigned Comment ID is identified above each comment. The comment text is segregated by yellow shading and horizontal black lines to distinguish one comment issue from another. **Appendix A** shows under which issue Ecology responds to each of the comments. Ecology's responses to those issues are in Chapter 3.

Jonathan Cronk (Commenter # 1)

ID-1: Jonathan Cronk

Submit Date: 5/28/26 @ 10:35 AM PT

Submit Method: Website

Comment ID: 1-1

Enforcing this rule and clarifying its documentation is a positive change, but further clarification and enforcement of contaminant fate should be considered in subsequent guidance documents. Enforcement of the additive risk rule should be expected to shift the preferred technology for many sites to excavation, which is not a socially positive shift. When considering the long-term environmental impacts of a contaminant, destruction should be preferable to burying it in a landfill. This preference for destruction is reflected partially in the Permanence and Long-term effectiveness criteria of DCA, however excavation can often be justified as ranking highly in these categories, which is not appropriate in my personal opinion.

Jerome Cruz (Commenter # 2)

ID-2: Jerome Cruz

Submit Date: 6/16/26 @ 3:03 PM PT

Submit Method: Website

Comment ID: 2-1

Please provide more instruction and examples on how to approach contaminants with natural background concentrations that exceed cleanup levels such as arsenic in groundwater. Can natural background be zeroed out and how is excess cancer risk derived? If an interpretation is made that the risk level from a hazardous substance like arsenic in groundwater which has natural concentrations much higher than the Method B levels (for example, an 8 ppb natural background average vs. 0.0027 ppb Method B carc. cleanup level), one interpretation would be to adjust downward the other contaminants down to their PQLs, which may not be realistic for cleanup given changing laboratory limits, and very lower standards. A specific example using arsenic will be useful.

Comment ID: 2-2

Multiple contaminants may not be co-located at a site. Therefore, the guidance should also advise discretion on making adjustments on cleanup levels based on additive risk and hazard if multiple contaminants are localized at a site.

Mark Adams (Commenter # 3)

ID-3: Mark Adams

Submit Date: 6/26/26 @ 10:15 AM PT

Submit Method: Website

Comment ID: 3-1

I have little to say about the details of the updated guidance on risk assessments in their role of choosing a preferred cleanup alternative. The science involved is beyond me. However, I would like to add a general caution against over-reliance on using risk assessments as a key or primary method of establishing cleanup levels and hence, cleanup alternatives. My cautioning comes from an early time under MTCA when risk assessments were a flourishing tool. This would be in the late 1980s and 1990s. I was involved in RI/FS studies at the time as a consultant and before numerical cleanup levels were developed. Because there were no fixed cleanup levels, risk assessment became the name of the game. The result was that virtually no actual cleanups were taking place. Instead, the need for actual cleanups was "risked away", and toxicologists became the most important people in reducing cleanup costs for PLPs. I fear that this new guidance will usher in another era where risk assessment renders most cleanups as no actual cleanups at all.

Jessica Spiegel WSPA (Commenter # 4)

ID-4: Jessica Spiegel (WSPA)

Submit Date: 6/26/26 @ 4:59 PM PT

Submit Method: Website

Comment IDs: 4-1, 4-2, and 4-3



Jessica Spiegel

Vice President, Northwest Region

June 26, 2026

Submitted online

Mr. Michael Feldcamp

Senior Toxicologist/Human Health Risk Assessor Toxics Cleanup Program

Washington State Department of Ecology

Re: WSPA Comments on the Department of Ecology's May 2026 Draft Guidance, MTCA Method B and C Target Cleanup Goals and Adjustments for Additive Risk and Hazard

Dear Mr. Feldcamp, et al:

The Western States Petroleum Association (WSPA) appreciates the opportunity to comment on the Department of Ecology's May 2026 draft guidance, *Method B and C Target Cleanup Goals and Adjustments for Additive Risk and Hazard*. WSPA is a non-profit trade association that represents companies that safely explore for, produce, refine, transport and market petroleum, petroleum products, natural gas, and other energy supplies in California, Washington, Oregon, Nevada, and Arizona.

Overall, we appreciate the Department of Ecology's effort to improve consistency and transparency in the evaluation of cancer risk and noncancer hazard goals for individual hazardous substances and combined (additive) impacts for Methods B and C under the Model Toxics Control Act (MTCA). The guidance addresses an area that has historically relied on professional judgment and varying approaches among practitioners.

We are incredibly appreciative of the decision to not include naturally occurring background concentrations or the practical quantitation limits (PQLs) for soil, groundwater, and surface water results in additive risk calculations that could result in cleanup levels below natural

background levels which is not allowed under the rule (WAC 173-340-705). Many practitioners in the field can describe lengthy and monumental efforts to achieve water quality results below natural background conditions; efforts that would be better spent on working towards solutions for more problematic materials. Similarly, rounding all risk assessment results to two significant figures provides the same efficiencies.

Comment ID: 4-1

WSPA would like to understand better how additive risk and hazard evaluations are performed for sites with only one type of source and chemical release (e.g., UST) versus a site with multiple sources unrelated sources and contaminants from different current and historical activities, even though the conceptual site models and exposure scenarios can be fundamentally different. We encourage Ecology to retain flexibility for site-specific risk evaluations before cleanup levels are adjusted downward in additive risk and hazard evaluations.

Site-Specific Evaluation Should Remain Central to Cleanup Decisions

Our primary concern relates to how the guidance may be implemented when cumulative cancer risk or noncancer hazard evaluations become the limiting factor, even though individual chemical concentrations remain at or below their applicable cleanup levels.

Comment ID: 4-2

The guidance appropriately explains how cleanup levels may be adjusted to meet MTCA's cumulative risk and hazard requirements. However, we recommend Ecology also encourage practitioners and project managers to evaluate whether a site-specific assessment is warranted before automatically reducing cleanup levels. The conceptual site model should remain an important part of that evaluation.

Comment ID: 4-1

For example, a release from a single petroleum UST typically contains multiple related petroleum constituents that originate from the same release mechanism, migrate through the same environmental media, and are evaluated using a common conceptual site model. This is a different scenario than a site with multiple unrelated sources and contaminants from different current and historical industrial activities, release mechanisms, and exposure pathways. Similarly, petroleum releases are already evaluated using additive approaches within existing petroleum guidance. As a result, automatically applying additional downward adjustments without considering the overall site conditions could result in cleanup requirements that are more conservative than necessary to achieve MTCA's protective objectives.

Comment ID: 4-2

We recommend Ecology include language encouraging consultation with the project manager and consideration of the conceptual site model before cleanup levels are adjusted solely because cumulative risk or hazard thresholds are exceeded.

Continue Developing Implementation Tools

Comment ID: 4-3

We appreciate the flexibility the guidance provides for risk apportionment decisions. As Ecology gains experience implementing this guidance, we encourage the Department to periodically evaluate how these decisions are being applied in practice and use that experience to develop additional implementation resources.

Examples of helpful resources include:

- additional worked examples and case studies;
- best practices developed from implementation experience;
- practitioner training opportunities; and,
- updates to the CLARC workbook that incorporate the additive risk and hazard adjustment equations and calculation procedures described in the guidance.

Providing these resources will improve transparency, reduce calculation errors, and promote more consistent implementation across cleanup sites.

Thank you again for the opportunity to provide comments on the MTCA guidance materials. WSPA appreciates Ecology's efforts to improve the implementation of additive risk and hazard requirements under MTCA.

On behalf of WSPA and its member companies, thank you for considering our comments. If you have any questions, please do not hesitate to contact me directly at (360) 918-2178 or via email at jspiegel@wspa.org.

Sincerely,



Grant Walter (Commenter # 5)

ID-5: Grant Walter

Submit Date: 6/29/26 @ 6:48 AM PT

Submit Method: Website

Comment IDs: 5-1 to 5-20

General Comments on the Draft Document

Comment ID: 5-1

The addition of Chapter 3 (Significant Figures in Risk Assessment) and Chapter 4 (Methods for Calculating Cancer Risk and Noncancer Hazards) implies that for each site with adjustment of the cleanup levels based on cumulative cancer risk and/or target organ hazard index (HI), a presentation of risk and hazard quotient estimates will be required.

- At a minimum, calculation and presentation of risk estimates and hazard quotients are implied to be necessary. It is understood that the 2001 concise explanatory statement (CES) included discussion of the performance of site-specific risk assessments and their relevance in the selection of cleanup levels.
- It is recommended that Ecology provide additional discussion/context as to when risk and hazard estimates should be presented, when a site-specific risk assessment is necessary, where in the site investigation process the adjustment should be considered, and when default cleanup levels are sufficient to make decision for a site.
- As the document is currently written, it implies that if the number of constituents is low, the cumulative risk and target organ HI requirements are met, and the presentation of cancer risk and hazard quotients (HQs) is not necessary. If this is the case, we request that Ecology provide this context within the guidance document.

Comment ID: 5-2

ARARs: Please clarify Ecology's position regarding safe drinking water act maximum contaminant levels (MCLs) sufficiency for protection of human health.

- The provided examples (specifically example 2, pg. 36 and 37) indicate that the equivalent risk for trichloroethylene and vinyl chloride MCLs exceed the acceptable target risk. Therefore, the MCLs cannot be used as the basis of a cleanup level. If this is the intent, please provide the policy rationale for this decision. Based on statements in the guidance document (pg. 35), the MCL has been developed and recommended for use for potable water systems because the MTCA value cannot be reached. If the policy decisions is not

relevant to selection of cleanup levels, at what point of the cleanup process will the technical or analytical limitations be considered in the cleanup process?

“ARARs do not, by themselves, necessarily define human health protectiveness. That is, some ARARs may be established at concentration higher than the relevant MTCA equation values (e.g., due to technical or analytical limitations).”

Comment ID: 5-3

The document discusses the influence of a conceptual site model (CSM) on the adjustment process twice in the document (Chapter 2, pages 12-13). The first and second mentions of the CSM indicate that the CSM can add more exposure pathways. However, a CSM is a fundamental component in the selection of cleanup levels and a more robust discussion of a CSM should be included that better explains that:

- CSMs identify relevant migration/transport pathways for contaminants at the site; and
- CSMs identify which pathways are complete/incomplete, significant/insignificant, and directly influence cleanup levels

As currently written, the document implies that the CSM is not needed in the development and/or selection of cleanup levels. Instead, the document implies that if the number of contaminants is sufficiently low (e.g., 15 carcinogens), the Method B criteria can be selected as cleanup levels and additional considerations are not necessary.

Comment ID: 5-4

The guidance document is focused on the presence or absence of a constituent(s) as the only factor in selection of a cleanup level, or additive chemicals for concurrent exposures. However, the CSM for the site greatly impacts the relevant cleanup levels as suggested in this same document and could be subtractive. Please provide additional discussion in the document as to the role of the following items in determining a cleanup level:

- The remedial investigation and/or other investigation efforts;
- The CSM;
- The frequency of detection;
- The frequency of exceedance; and
- The results of a site-specific risk assessment.

Comment ID: 5-5

Please include relevant ecological risk guidance and cleanup criteria within the document and how they influence adjustment of Method B and Method C cleanup criteria. The guidance

provides a preference for leaching based values as the basis of cleanup levels. We assume that the preference would also apply to cleanup levels based on ecological endpoints (e.g., leaching to groundwater and protection of surface water based on an ecological endpoint or protection of terrestrial wildlife).

Specific Comments on the Draft Document

Comment ID: 5-6

Page 7 footnote 2: MTCA Method A values are not exclusively based on direct contact (i.e., incidental ingestion, dermal contact, or inhalation) exposure routes as noted in the “note” box on page 10. For soil, there are multiple constituents where the Method A value is based on the protection of groundwater/leaching pathway and/or incorporate adjustments for natural background (e.g., arsenic).

Comment ID: 5-7

- Does Ecology expect that migration to groundwater/leaching values will always be included in the cumulative risk and target organ HI adjustments for cleanup levels? Based on the “note” box on page 10, it appears that Ecology prefers the selection of these endpoints and then the adjustment of the additive risk is no longer necessary for consideration.

Comment ID: 5-8

- If not, can Ecology clarify the intent of the adjustment for Method A values in the footnote and specify how this adjustment should be done and for which exposure routes/exposure pathways the adjustment of Method A values should apply? For example, TPHs do not have Method B values available in CLARC. Is the expectation that Method B calculations are necessary?

Comment ID: 5-9

Page 8: “Adjustments” bullet, second paragraph: It is advisable to apportion the “adjustments” for hazardous substances in a manner that is supported by technically defensible lines of evidence and based on the CSM (e.g., detected concentrations and their distribution in site media, complete/incomplete exposure pathways)?

- Please provide guidance for readers as to reasons/justifications that can be used to apportion the “excess risk” and “excess hazard” in the adjustment process.

Comment ID: 5-10

- Further, are there any lines of evidence that can be used to exclude a detected contaminant from consideration, including based on the CSM? For example, the Risk Assessment Guidance for Superfund (RAGS), Part A (pg. 5-20) does discuss the utility of performing an optional

concentration-based screening to reduce the number of COPCs. However, since the adoption and use of RAGS over the past 35 years, the optional COPC screening has become mandatory to focus evaluation in remedial investigations on to those COPCs that contribute the greatest risk and/or hazard.

- Please provide context or explanation as to the applicability of a concentration-based screening and the impact on the additivity guidance with the results of a concentration-based screening.

Comment ID: 5-11

Page 8 “Important” note box: For the simplified situation where the cleanup level is below background (e.g., Method B values for arsenic are below the representative state soil and groundwater background concentrations), the Method B value shouldn’t be used to directly adjust the cleanup levels.

- However, guidance should be provided in situations where the background concentration is below relevant risk-based cleanup levels (e.g., Method A value for arsenic in soil).
- Please provide additional discussion or an example in the guidance that expresses Ecology’s guidance for this common situation.

Comment ID: 5-12

- The guidance states that if the downward adjustment process calculates a new CULadj for a chemical that lands below its PQL, then the guidance allows for this chemical to be zeroed out (i.e., not included in the additive risk calculation) when evaluating compliance with additive cancer risk and noncancer hazard (i.e., HI) goals. However, the guidance doesn't address how to handle a chemical whose CULadj, as a result of this downward adjustment, falls below its PQL—specifically, whether that constituent is then zeroed out entirely and excluded from the additive risk calculation, or whether it should be handled some other way. Could Ecology clarify how this scenario should be treated, and consider adding language to Chapter 1 addressing it?

Comment ID: 5-13

Page 9 first sentence of paragraph 1: Please clarify the intent of the term “present” for the carcinogenic and hazard adjustment.

- Is the intent to indicate that there are 15 carcinogens present or is that there are 15 carcinogens that have been identified as COCs for a site?
- There is a significant difference between a constituent being detected in a Site medium versus the contaminant being identified as a chemical of concern (COC) through the remedial investigation. The term present is unclear with regards to analytical method precision (e.g., detection and reporting limits, natural background).

Comment ID: 5-14

Page 14 “Individual chemical” bullet: Please clarify the prioritization in determining when a cleanup level has been met. Because the cumulative risk/target organ HI (it’s noted that individual cancer and hazard are discussed in the bullet) estimates are rounded to one significant figure and the media cleanup levels are based on two significant figures, it is common that a concentration (either a single result or an area average) will exceed the cleanup level but not the target cumulative risk/target organ HI endpoint.

- What is Ecology’s position on prioritizing these methods to determining compliance?

Comment ID: 5-15

Page 21 “Note” box: Please clarify in the guidance document if screening for COPCs or if the CSM can be used to limit the number of constituents considered for further evaluation as part of a site investigation or if the presence/suspected presence of a constituent or class of constituents is the only justification needed to include a constituent for the “adjustment” of the Method B and Method C cleanup levels. This part of the document does not match the discussion on Page 9 (i.e., defining if a chemical is “present” and how initial screening values are used, as commented above).

Comment ID: 5-16

Page 23-24 footnote 23 and Table 1: Please clarify how individual chemical and summation parameters will be accounted for in the determination of the total number of constituents (e.g., >15) considered in adjustment of the Method B and Method C values.

- The example provided in the footnote implies that not all of the seven carcinogens need to be considered when the TEF and TEQ are used to evaluate total cPAH mixtures, and the individual benzo(a)pyrene for considering individual chemical toxicity. Only benzo(a)pyrene and 2,3,7,8-TCDD are shown in the example Table 1, suggesting that for individual cPAHs and

dioxin/furans other than these 2 chemicals are not counted towards the 15 total chemicals present but rather rely on screening of their respective TEQs.

- How will the adjustment work when there are overlapping chemicals within a summation parameter (e.g., high molecular weight PAHs and cPAHs).
- Can Ecology please provide guidance on how summation parameters should be considered when accounting for cumulative risk and target organ HI?

Comment ID: 5-17

Page 35, Footnote 25: The text related to the footnote contradicts the information provided in example 2. If the ARAR with a cancer risk above 1×10^{-6} is considered protective as stated in the footnote, why are MCLs with a cancer risk above 1×10^{-6} for TCE and VC not considered protective of human health?

Comment ID: 5-18

Page 48: Please clarify Ecology's use of Equation 740-3 and 745-3 for TPH versus use of the Method A values provided in the Cleanup levels and Risk Calculation (CLARC) tables?

- Should the calculated cumulative risk and target organ HI account for TPH concentrations at a site?
- Should TPH calculations be kept separate from individual chemical calculations?
- Please also provide guidance for the same questions for groundwater TPH equations and Method B/C values as well (Equation 720-3, pg. 59).

Comment ID: 5-19

Page 60: Are the exposure factors provided in these tables prioritized over other relevant guidance from Ecology (e.g., Sediment Cleanup User's Manual, Water Quality Standards for Surface Waters of the State of Washington Chapter 173-201A WAC)? Are there prioritization preferences from Ecology on which exposure factors should be used? Please provide guidance and rationale as to what is considered a reasonable maximum exposure (RME) scenario when there are multiple guidance documents that present different scenarios and values.

Comment ID: 5-20

Page 51, 52, 56, 57, 61, and 66: There are "Error! Bookmark not defined" errors in the provided links. Please remove or adjust the links to resolve the errors.

If Ecology wishes to discuss these comments or has questions related to the comments, please feel free to reach out to schedule a meeting.

Anonymous (Commenter # 6)

ID-6: Anonymous

Submit Date: 6/29/26 @ 4:11 PM PT

Submit Method: Website

Comment ID: 6-1

We understand that the requirement to adjust cleanup levels for additive cancer risk and noncancer hazard index goals is written into MTCA and is necessary to protect exposure at a residential property where an adult or child may actually come into contact with impacted material. However, at a commercial or industrial property, or within a right-of-way, where the impacted material is at a depth below 3 feet, or a reasonable depth where direct contact is unlikely to occur, this approach to adjusting cleanup levels creates unnecessary effort and a potential increase to costs to achieve regulatory closure, with no commensurate risk reduction to a receptor.

Endnote References

- ⁱ <https://app.leg.wa.gov/rcw/default.aspx?cite=34.05.325>
- ⁱⁱ <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-700>
- ⁱⁱⁱ <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-705>
- ^{iv} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-706>
- ^v <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-708>
- ^{vi} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-357>
- ^{vii} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-720>
- ^{viii} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-740>
- ^{ix} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-360>
- ^x <https://app.leg.wa.gov/rcw/default.aspx?cite=70A.305.030>
- ^{xi} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-350>
- ^{xii} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-703>
- ^{xiii} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340-7491>
- ^{xiv} <https://apps.leg.wa.gov/WAC/default.aspx?cite=173-204>
- ^{xv} <https://apps.leg.wa.gov/wac/default.aspx?cite=173-340>