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WAC 173-350-325, Soil and Sediment Criteria and Use - Workgroup Face-to-Face

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Agenda

Bulleted items that are not italicized are comments from the meeting. *Italicized wording represent the issues discussed.*

Agenda

- Basis for Soil Screening Limits (SSL) – Unrestricted vs. Limited
    - MTCA
    - EPA
    - Dangerous Waste Regulation
    - Natural Background
    - PQLs
    - Protection of Groundwater
- Refining Limited Access Definition
- Draft SSLs:
    - Metals
    - Petroleum
    - pH
    - cPAHs
    - Dioxins, Furans, PCBs (postponed)
- Topsoil testing
- Pesticides (sediment) (postponed)
- Revisit required parameters (postponed)

Basis for Soil Screening Limits (SSL) – Unrestricted vs. Limited

In general, used existing standards to avoid regulatory conflicts and avoid creation of cleanup sites.

Unrestricted:
Human health and ecological impacts need to be considered for unrestricted land uses. Based draft SSLs on the most protective (lowest) of values from the following list of criteria:

MTCA Method A (unrestricted)
MTCA Method B
MTCA site-specific TEE (Terrestrial Ecological Evaluation)
EPA Eco-SSL
EPA SSL
Triggering of TCLP under dangerous waste criteria
Protection of groundwater (not completed)
Adjusted SSL upward where natural background or PQL were above the lowest limit

Limited Access Properties:
Human health and ecological impacts have a lower consideration for Limited Access Properties than Unrestricted. For this reason, based draft SSLs on most protective values from:

MTCA Method A (industrial)
MTCA Method B (where no MTCA Method A limit existed)
MTCA Simplified TEE (Terrestrial Ecological Evaluation)

Triggering TCLP under dangerous waste criteria
Adjusted SSL upward where natural background or PQL were above the lowest limit

The exception to the above methodology is for pH, explained later in these notes.

MTCA Method A Unrestricted and Industrial: Method A limits account for risks to human health alone and are established for 25-30 of the most common hazardous substances at cleanup sites. Cleanup sites would need to account for ecological impacts separately, unless they are not a concern.

MTCA Method B Non-Cancer and Cancer: Method B limits account for risks to human health alone. Cleanup sites would need to account for ecological impacts separately, unless they are not a concern.

MTCA Method C: For industrial sites only (as defined by MTCA) so not considered.

MTCA Simplified Terrestrial Ecological Evaluation (TEE), Table 749-2: Table 749-1 includes an equation to determine whether to take into consideration ecological impacts (using Simplified TEE figures). Based on results of Table 749-1, TEE might not need to be considered for Limited Access Properties. However, Simplified TEE figures would be required for determining cleanup levels at a cleanup site with no substantial threat to terrestrial ecological receptors and where there are no physical barriers preventing plants, soil biota, or wildlife from exposure. Limited Access Properties fit that description. Also, several parameter limits in MTCA Method A may be outdated because ecological impacts were assessed after adopting Method A limits. For these reasons, Simplified TEE figures were included in determining SSLs for Limited Access Properties.

MTCA Site-Specific Terrestrial Ecological Evaluation (TEE), Table 749-3: Site-Specific TEE figures are more protective than Simplified TEE figures because there is an assumed threat to sites of ecological importance. These figures were included in determining SSLs for Unrestricted properties. Values are based on Oak Ridge National Lab research on impacts to plants, soil biota, and wildlife.

MTCA Protection of Groundwater from Soil, Equation 747-1: Marni is still working to calculate these. Using groundwater quality standards of WAC 173-200 instead of cleanup levels in working through the math. Not considering for Limited Access Properties as currently defined as 10 feet above water table, though we may need to reconsider.

EPA Soil Screening Levels (SSLs): The Soil Screening Guidance is a tool that the U.S. Environmental Protection Agency (EPA) created to help standardize and accelerate cleanup of contaminated soils at sites with anticipated future residential land use scenarios. They do not account for ecological impacts. Generally, at sites where contaminant concentrations fall below SSLs, no further action or study is warranted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Soil Screening Guidance includes generic SSLs for use where site-specific data is limited. Generic SSLs were used for assessing Unrestricted contaminant limits. In determining SSLs, used the lowest of values based on human ingestion, inhalation, and protection of groundwater assuming some attenuation would take place in the soil prior to reaching groundwater.

EPA Ecological Soil Screening Levels (Eco-SSLs): Eco-SSLs are concentrations of contaminants in soils that are protective of organisms that often meet or eat other organisms that live in or on soil. The EPA set Eco-SSLs for contaminants often found in soils at Superfund cleanup sites. The Eco-SSLs were derived to limit the need for EPA and other risk assessors to perform duplicate literature searches and data assessments for the same contaminants at every site. The limits were considered for Unrestricted sites.

Chapter 173-303 WAC, Dangerous Waste Regulations: The toxicity characteristic list in WAC 173-303-090 includes Toxicity Characteristic Leaching Procedure (TCLP) values for requirements to manage the material as a dangerous waste (DW), not a solid waste. Those handling materials are allowed to do "totals" testing as opposed to "TCLP" as a first step (total values to compare to the list are the TCLP values x 20). This total value was used as the SSL when it indicated a soil might be DW. If test results exceed this, the material would then require TCLP to see if it were DW. It a material exceeded TCLP values, it must be managed as DW. If it did not exceed TCLP values, then a second SSL is proposed for the next most protective standard.

Natural Background Soil Metals Concentrations in Washington State: Some soils in WA have naturally high levels of metals. SSLs were raised to natural background when other standards fell below natural background.

Practical Quantitation Limits: Marni is still gathering these, but where found to be higher than current SSL, will raise the SSL to the PQL.

Refining Limited Access Definition

Definition now: "Limited access properties" includes land that has limited human and animal access due to activities that take place on the property or physical barriers, is 10 feet above the water table, and has controls to prevent runoff to surface water.

To avoid potential risks associated with allowing higher limits for TPH and other constituents of concern, we may need to consider placing more limitations in definition:

Nearness to structures to limit vapor intrusion risk.
Separation from wells – 100'.
Not in 10-year wellhead protection area.
Not adjacent to wetlands, surface water.
Future land use restrictions.

Existing Ecology guidance for reuse of petroleum contaminated soil and street waste have lower limits for several constituents than draft SSLs proposed today. They also place greater restrictions than proposed in the definition above of Limited Access Properties for acceptable reuse. Marni plans to meet with Ecology's Toxic Cleanup Program, which is primarily responsible for limits in existing guidance, to see where they stand with the draft SSLs.

- The greater Spokane area is in a 10-year wellhead protection area so a restriction on that would eliminate potential uses.
- One noted the "prevent runoff to surface water" in our existing definition and thinks it should be removed. Sites have allowable discharge to surface waters in conformance with NPDES or Stormwater permits. Marni will try to address this in a next draft, perhaps tie the restriction to those without an approved discharge.

Draft SSLs

General comments about limits:

- Several expressed concern that the proposed criteria levels for unrestricted land use are unrealistic. No soils will meet the proposed limits.
- With the proposed Unrestricted SSL, all soils would be suspected of containing contaminants in excess of the SSLs, therefore all soils would be subject to testing and other requirements of the rule.
- Marni chose limits that are based on scientific research, including actual impacts to humans, plants, animals, etc. as well as risk-based modeling. If others have data to help justify different limits, please share it with Marni.
- The use of natural background limits is inappropriate considering they are not based on impacts, were derived from testing soils only at unimpacted sites, and are sometimes below natural background at certain locations.
- Marni pointed out that natural background limits were used when the SSL based on other criteria was below natural background. Avoiding use of natural background would result in an even lower SSL.
- Natural background limits are not based only on unimpacted sites. There was a focus on urban areas specifically, in addition to other areas of the state.
- There are some natural background limits higher in certain locations than those established in the 1994 report. Marni felt the flexibility existed in draft rule language now to request higher limits for such circumstances. Others felt that added another layer of bureaucracy. Marni will explore how to we can address this more easily.
- EPA-SSL limits are not specific to western U.S. soils. Marni will look more closely at these numbers to help ensure use of limits that are appropriate for our region.
- Some felt using the 20x rule for dangerous waste determination was inappropriate as even cleanup levels are sometimes higher (e.g. lead).
- Marni pointed out that cleanup levels can exceed dangerous waste criteria. Since dangerous waste criteria account for any situation, they are more protective than the site-specific cleanup limits at cleanup sites.
- We discussed whether anyone thought there was a high risk that soils would designate as dangerous waste. The consensus was that the risk was low and that we should remove using the 20x rule from consideration.
- Regarding use of MTCA Simplified TEE limits for Limited Access Properties, the consensus was that we remove that from consideration since ecological values for sites would be low.
- Discussed how the rule or SSLs would work for sites to be developed. If used Limited Access SSLs, would that prevent future residential or other use of a property? This rule will not govern future land use, but it is possible land use authorities could use SSLs to restrict development. This is a new issue. Perhaps allowing the Limited Access SSLs provided there is a certain depth of coverage over it will help prevent development restrictions. Marni will explore this further.
- Phase I site assessment consultants use MTCA Method A when looking at sites and we should too.

Metals (mg/kg)

	Unrestricted Land Use	*Limited Access Properties*
Arsenic	*7* *Natural background, increased from most protective value of 0.029.*	*20* *MTCA Meth A, Industrial.*

Barium	*102* *Based on MTCA ecological impacts for wildlife.*	*1,320* *MTCA Simplified TEE.*
Cadmium	*1* *Natural background, increased from most protective value of 0.36.*	*2* *MTCA Meth A, Industrial.*
Chromium (total)	*42* *Natural background, increased from most protective value of 38.*	*42* *Natural background.*
Chromium III	*26* *Based on EPA Eco-SSL for wildlife.*	*2,000* *MTCA Meth A, Industrial.*
Copper	*36* *Natural background, increased from most protective value of 28.*	*550* *MTCA Simplified TEE.*
Lead	*17* *Natural background, increased from most protective value of 11.*	*100* *Based on triggering TCLP under Dangerous Waste Regulation.* *If not determined to be DW, limit would be 220 based on MTCA Simplified TEE.*
Mercury	*0.3* *Based on MTCA ecological impacts for plants.*	*2* *MTCA Meth A, Industrial.*
Nickel	*38* *Natural background, increased from most protective value of 30.*	*1,600* *MTCA Meth B.*
Selenium	*0.75* *PQL, increased from most protective value of 0.3.*	*0.8* *MTCA Simplified TEE.*
Silver	*2* *Based on MTCA ecological impacts for plants.*	*100* *Based on triggering TCLP under Dangerous Waste Regulation.* *If not determined to be DW, limit would be 400 based on MTCA Method B.*
Zinc	*86* *Natural background, increased from most protective value of 46.*	*570* *MTCA Simplified TEE.*

- Arsenic should be 20
- Lead should be 250
- Would this rule apply to crushed rock? Our draft definition for soils seems likely to encompass that. That raised a concern because there was an instance where rocks were crushed into gravel and reused at a site. The gravel had 9 ppm arsenic and they were required to remove it. Arsenic of 9 ppm was natural and not due to any man-made impact.

<u>Petroleum</u>

Environmental Assessment Program study of ecological impacts for TPH to be done by June 2015.

	Unrestricted Land Use	*Limited Access Properties*
TPH – Gasoline, benzene present	*30* *MTCA Meth A, Unrestricted.*	*30* *MTCA Meth A, Industrial.*
TPH - Gasoline, no benzene present	*100* *MTCA Meth A, Unrestricted, Site-specific TEE.*	*100* *MTCA Meth A, Industrial.*
TPH – Diesel	*200* *MTCA, Site-Specific TEE.*	*2,000* *MTCA Meth A, Industrial, Simplified TEE.*
TPH – Heavy Oil	*2,000* *MTCA Meth A, Unrestricted.*	*2,000* *MTCA Meth A, Industrial.*
TPH – Mineral Oil	*4,000* *MTCA Meth A, Unrestricted.*	*4,000* *MTCA Meth A, Industrial.*
Benzene	*0.01* *Protection of groundwater.*	*0.03* *MTCA Meth A, Unrestricted & Industrial*
Toluene	*7* *MTCA Meth A, Unrestricted & Industrial, protection of groundwater*	*7* *MTCA Meth A, Unrestricted & Industrial, protection of groundwater*
Ethylbenzene	*6* *MTCA Meth A, Unrestricted & Industrial, protection of groundwater*	*6* *MTCA Meth A, Unrestricted & Industrial, protection of groundwater*
Xylene	*9* *MTCA Meth A, Unrestricted & Industrial, protection of groundwater*	*9* *MTCA Meth A, Unrestricted & Industrial, protection of groundwater*
Napthalene	*5* *MTCA Meth A, Unrestricted & Industrial, protection of groundwater*	*5* *MTCA Meth A, Unrestricted & Industrial, protection of groundwater*
MTBE	*0.09* *Protection of groundwater.*	*0.1* *MTCA Meth A, Unrestricted & Industrial*

- Pierce County allows only 200 TPH-diesel in its inert waste landfills. Feels that 2,000 would be too high.
- Marni explained that in her search for the rationale behind lower limits in existing Ecology guidance, the driver for lower TPH-diesel limits was impact to soil biota. Since Limited Access Properties have little ecological value, it seemed unreasonable to justify lower limits.
- Marni stated that vapor intrusion and impacts to water need to be evaluated further.

<u>pH</u>

6.5 - 8.5

— *pH is based primarily on groundwater quality standards. pH 9 will affect aquatic organisms. Without site-specific assessment, cannot assume natural conditions will prevent impacts.*

— *Marni consulted Andy Bary, WSU, who has done work with pH impacts on agricultural crops. Some plants die at 8.5, most die at 10. Not familiar with any research on forests, native vegetation, or soil biota impacts.*

— *Marni consulted Sally Brown, UW, who says that pH will equilibrate to 8.3 within 6 months-1 year when exposed to air. More quickly on the west side due to higher moisture. For fill, where there is no/limited exposure to air, she has not done research. Says that for higher pH, if from a calcium additive, may not be a lot of damage to groundwater. If from a sodium additive, it is more of a concern. Thinks pH as high as 12 would be from a sodium additive, which should be avoided altogether. For higher pH materials for fill, she thinks one should treat it prior to use as fill by storing until pH can equilibrate, add organic matter or ammonia fertilizer, or mix with chunky materials such as wood to promote aeration.*

— *Marni looked at a variety of WA soil profiles and found those she looked at to be between about pH 5 and 8 in the upper few feet.*

— *Compost limit is 5-10. Unsure how pH as high as 10 was derived. Guidance on composting used in rule development had an upper limit of 8; TMECC has upper limit of 8; no rule development documents on pH specifically, nor were any comments submitted on the pH proposed; Marni contacted former staff involved with rule development and they do not remember focusing attention on pH. Given compost has limited application rates and likely to equilibrate if ever a compost with pH of 10 was sold, is not a good comparison to fill soil. Could be that lower and upper limits were expanded to account for purposeful pH adjustment to suit customer needs.*

— *Rule has flexibility to go beyond table limits with written approval by JHD and Ecology.*

- Ecology Water Quality would be comfortable with a pH limit of 9.
- The Brightwater Tunnel project that removed unimpacted soil at depth had pH of 9.7. Marni mentioned that she found in her WA soil profile research, pH seemed higher at depth than at surface level.
- Soils received at one facility range from about 8.8 to 9.3
- pH of 6-9 is allowed by industrial discharge permits
- There are human impacts, such as to the eyes, at around pH 9-10. L&I likely has some standard on this.
- Regarding the lower pH range, the Palouse has naturally low levels at 4.5-5.
- Regarding lower pH range, worry over 3rd party lawsuits if SSL is too protective. Concerns by third parties regarding ocean acidification, shellfish impacts, and other issues. Groups will likely look at the SSLs when scrutinizing projects or soil handling facilities.
- Marni will look more closely at pH impacts on the lower and higher spectrum.

<u>cPAH</u>

Unrestricted:	*0.1 mg/kg. Based on MTCA Meth A, Unlimited. (Oregon RBC 0.015 residential)*
Limited Access:	*2 mg/kg. Based on MTCA Meth A, Industrial. (Oregon RBC 2.1 construction worker)*

Only cPAHs considered as PCS Guidance, Stormwater Manual, and SCUM refer to cPAHs. Value is the benzo(a)pyrene equivalent concentration of benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

- One workgroup member was satisfied with these SSLs
- One non-workgroup member thought the Limited Access SSL was potentially too high and could lead to future liability or development restrictions

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Topsoil testing

Marni had given thought to testing of manufactured topsoil and the original plan for the rule to apply to topsoil with components of impacted soil in its condition before it leaves a site. This rule work is not about setting product quality standards, or about altering the quality of impacted soils by blending it with other materials before testing. It is meant to help determine where to take an impacted soil, including reuse, disposal, or treatment sites. A topsoil manufacturer should determine whether soils coming in will meet the Unrestricted SSLs. If a topsoil manufacturer wants to accept soils above the Unrestricted SSLs, there are options to become a treatment facility.

THE AGENDA ITEMS BELOW WERE POSTOPONED UNTIL THE NEXT MEETING.

Dioxins

Unrestricted:	*0.000002 mg/kg (2E-06). Based on MTCA Site-specific TEE (see explanation below)*
Limited Access:	*0.0000128 mg/kg (1.28E-05). Based on MTCA Meth B (see explanation below)*

Unrestricted must account for ecologic impacts. As such, need to obtain separate values for dioxins, furans, and dioxin-like PCBs. Value above is the sum of the TEF equivalency for 7 dioxin congeners as compared to chlorinated dibenzo-p-dioxins (2,3,7,8-TCDD).

Limited Access does not account for ecologic impacts. As such, value above is the sum of the TEF equivalency for 7 dioxin congeners, 10 furan congeners, and if PCB is of concern, 12 dioxin-like PCBs as compared to chlorinated dibenzo-p-dioxins (2,3,7,8-TCDD).

Furans

Unrestricted:	*0.000002 mg/kg (2E-06). Based on MTCA Site-specific TEE (see explanation below)*
Limited Access:	*NA (See dioxins above)*

Unrestricted must account for ecologic impacts. As such, need to obtain separate values for dioxins, furans, and dioxin-like PCBs. Value above is the sum of the TEF equivalency for 10 furan congeners as compared to chlorinated dibenzofurans (total).

PCB

Dioxin-like PCB:

Unrestricted:	*0.000002 mg/kg (2E-06). Based on MTCA Site-specific TEE (see explanation*

below)
Limited Access: *NA (See dioxins above)*

Unrestricted must account for ecologic impacts. As such, need to obtain separate values for dioxins, furans, and dioxin-like PCBs. Value above is the sum of the TEF equivalency for 12 dioxin-like PCB congeners as compared to chlorinated dibenzo-p-dioxins (2,3,7,8-TCDD).

PCB Congener/ Total Aroclors:
Unrestricted: *0.5 mg/kg. Based on MTCA method B*
Limited Access: *0.5 mg/kg. Based on MTCA method B*

Comparison to SSL can be based on analysis for 209 PCB congeners (Method 1668) or analysis for Total Aroclors (Method 8082).

Pesticides (sediment)

Revisit required parameters