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**To:** [Council, City](#)  
**Cc:** [Raybould, Claire](#)  
**Subject:** Public Comment: 10 March 2025 City Council Meeting Agenda Item 6. Adoption of an Interim Urgency Ordinance  
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**Attachments:** [Public Comment Letter Re 10 March 2025 City Council Meeting Agenda Item 6.pdf](#)

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Please see attached Public Comment Letter re: 10 March 2025 City Council Meeting **Agenda Item 6. Adoption of an Interim Urgency Ordinance**

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3 March 2025

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Subject: **Public Comment Letter: Regarding 10 March 2025 City Council Meeting Agenda Item 6.**  
Adoption of Interim Urgency Ordinance of the Council of the City of Palo Alto Amending Chapter 18.40.160 (Replacement Project or Discretionary Review Required) of Title 18 (Zoning) of the Palo Alto Municipal Code to Allow for Early demolition or Deconstruction on Contaminated Sites

Dear Ms. Raybould:

I have reviewed the proposed language for the Interim Urgency Ordinance of the Council of the City of Palo Alto Amending Chapter 18.40.160 (Replacement Project or Discretionary Review Required) of Title 18 (Zoning) of the Palo Alto Municipal Code to Allow for Early demolition or Deconstruction on Contaminated Sites. I understand that it is the City's intent to develop an ordinance that is applicable to sites being remediated to residential use standards under the oversight of different environmental regulatory agencies pursuant to approved remediation plans. As currently drafted, Section 18.40.160 (b)(2) of the draft Interim Urgency Ordinance states:

*2) Sites granted an early demolition or deconstruction permit pursuant to this subdivision (c) must remediate the hazardous site conditions to the environmental screening levels compatible with residential use, according to the California State Water Resources Control Board.*

I strongly recommend that language of this section be modified as "environmental screening levels" that are published by the San Francisco Bay Regional Water Quality Control Board ("Water Board") are **generic screening levels** that have not been have not been adopted by other environmental regulatory agencies such as the California Department of Toxic Substances Control nor are they equivalent to site cleanup levels that are approved by the Water Board on a case-by-case basis pursuant to Section 4.25.2.3 of the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan; Regional Water Board 2017b) under approved remedial plans. The difference between generic environmental screening levels and site-specific cleanup levels is articulated in #14 of the attached FAQs sheet published by the California Water Boards (attached) which states:

*14. Do the ESLs have to be used as cleanup levels?*

*Setting cleanup levels is detailed in Section 4.25.2.3 of the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan; Regional Water Board 2017b). Cleanup levels are approved on a case-by-case basis by the Regional Water Board. Proposed final cleanup levels are based on a discharger-developed feasibility study of cleanup alternatives that compares effectiveness, cost, time to achieve cleanup standards, and a risk assessment to determine impacts on beneficial uses, human health, and the environment. Cleanup levels must also take into account the mobility and volume of pollutants. Proposed cleanup levels can differ from the ESLs provided: (1) they are adequately supported by a site-specific risk assessment or other evaluation or, alternatively, (2) that a feasibility analysis demonstrates it is not possible to clean up to ESLs. For all sites performing human health risk assessments, an alternative with an excess cancer risk of 1 in 1,000,000 (10<sup>-6</sup>) or less must be considered.*

Further, environmental screening levels published by the San Francisco Bay Regional Water Quality Control Board, have not been adopted by other environmental regulatory agencies. Therefore, requiring cleanup to these Water Board derived generic screening criteria is inconsistent with the City's intent to develop an ordinance that is applicable to sites being remediated under the oversight of different environmental regulatory agencies pursuant to approved remediation plans.

I recommend that the language in the draft ordinance Section 18.40.160 (b) (2) be changed as follows:

*2) Sites granted an early demolition or deconstruction permit pursuant to this subdivision (c) must remediate the hazardous site conditions to **cleanup levels compatible with residential use**, as approved by the applicable oversight agency, such as the California Department of Toxic Substances Control, California Water Resources Control Board, or County of Santa Clara Department of Environmental Health.*

The change in the language of this section of the draft Interim Urgency Ordinance should also be reflected in paragraph 4 of page 2 in the City Council Staff Report, which states the following:

*The proposed code amendment contains the following key criteria that sites must meet and comply with in order to utilize this code provision:*

- *Must be on a property that is eligible for inclusion on any list of hazardous materials release sites maintained pursuant to California Government Code Section 65962.5 (as maintained by the Environmental Protection Agency);*
- *Must remediate to environmental screening levels as set forth by the Regional Water Quality Control Board;*

I recommend that this language be modified to state:

*The proposed code amendment contains the following key criteria that sites must meet and comply with in order to utilize this code provision:*

- *Must be on a property that is eligible for inclusion on any list of hazardous materials release sites maintained pursuant to California Government Code Section 65962.5 (as maintained by the Environmental Protection Agency);*
- *Must remediate to **cleanup levels compatible with residential use**, as approved by the applicable environmental oversight agency, such as the California Department of Toxic Substances Control, California Water Resources Control Board, or County of Santa Clara Department of Environmental Health.*

Please feel free to contact me if you have any follow-up questions. I can be reached at (650) 533-4856 or by e-mail at [vhnelson@ekiconsult.com](mailto:vhnelson@ekiconsult.com).

Very truly yours,

EKI ENVIRONMENT & WATER, INC.



Vera H. Nelson, P.E.  
Vice President

Attachments

Attachment A: Frequently Asked Questions (FAQs) Environmental Screening levels (ESLs): 2019 Update  
Revision 1 by the California Water Boards.

Attachment A:

Frequently Asked Questions (FAQs) Environmental Screening levels (ESLs): 2019 Update Revision 1 by  
the California Water Boards.



# Frequently Asked Questions (FAQs)

Environmental Screening Levels (ESLs): 2019 Update  
(Revision 1)

San Francisco Bay  
Regional Water Quality Control Board

# Frequently Asked Questions: 2019 Environmental Screening Level (ESLs)

## CONTACT INFORMATION

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## **A. GENERAL QUESTIONS**

### **1. How often are the ESLs revised?**

The ESLs are revised periodically to reflect changes in toxicity values, changes in our understanding of the fate and transport of contaminants, and other developments in environmental risk assessment. The revision schedule is dictated by practical considerations and limited staff resources. Major updates are published every few years, and users are notified via our electronic mailing list (see FAQ #3). Minor revisions will be made as soon as any errors in the ESL values are identified. The ESL Workbook will indicate the date of the major update and the current revision number (e.g., January 2019 - Rev. 1).

The ESLs are considered “evergreen,” as they change over time to reflect the most current scientific information. We have to prioritize items for updating since we usually do not have time to address all identified issues during each update. Since the ESLs are never “final”, we use the term “interim final” to describe the major update versions of the ESLs. If you think you found an error or have suggestions for new topics or clarifications to be included in a future update, please let us know by contacting the ESL Team at [ESLs.ESLs@waterboards.ca.gov](mailto:ESLs.ESLs@waterboards.ca.gov). We appreciate comments from users and try to address them or incorporate them in future updates to the extent possible.

### **2. How do I know if I have the most recent version of the ESLs?**

The most recent version of the ESLs will be available on the website: [http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/esl.shtml](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.shtml). On the website under Update Process, there is an ESL status sheet file for the current (major) update with information and dates for all current minor revisions. In addition, the version information is listed on each table of the ESL Workbook.

### **3. How can I find out about updates?**

If you would like to be notified when new ESL updates are available, you may subscribe to our email list on the following web page: [http://www.waterboards.ca.gov/resources/email\\_subscriptions/reg2\\_subscribe.shtml](http://www.waterboards.ca.gov/resources/email_subscriptions/reg2_subscribe.shtml). Alternatively, consult the ESL status sheet on the website (see FAQ #2).

### **4. Which are the official ESL documents?**

The ESLs consist of five components: 1) Cover Memo; 2) Microsoft Excel Workbook and Summary ESL Tables (PDF); 3) User’s Guide; and 4) Frequently Asked Questions (FAQs).

### **5. Can I get the password for the Workbook?**

As a matter of policy, the Regional Water Board does not provide the password. Having multiple versions in circulation at one time diminishes the ESLs’ credibility and usefulness and potentially causes confusion.

## B. APPLICATION OR USE QUESTIONS

### 6. What is the effective date of the ESLs?

The effective date is the date the Workbook is posted to the ESL webpage (e.g., January 24, 2019).

### 7. Do the new ESLs have to be used as soon as the Workbook is posted?

The ESLs are guidance and are never mandatory. In general, we recommend the current version be used, but there can be exceptions. The following table provides a general timeline for when to apply the new ESLs depending on the status of a case.

Case Status	When to Use the 2019 ESLs
New case	Promptly following release
Prior to RAP approval	Promptly following release
Post RAP approval – TCE sites	By end of 2019
Post RAP approval – non-TCE sites	During next 5-year review
Pre-Closure	During low-threat closure assessment
<b>Acronyms:</b> RAP = remedial action plan TCE = trichloroethene	

We recommend consulting with the Regional Water Board case manager when determining the applicability of the new ESLs. For example, use of the new ESLs might not be needed for cases where the site is well-characterized with sufficient current information for a site-specific risk evaluation.

### 8. Are the ESLs applicable throughout California?

The ESLs are developed and maintained by the San Francisco Bay Regional Water Quality Control Board (Region 2) whose jurisdiction is limited to its defined geographic limits. The ESLs are used by Region 2 staff and publicly shared for transparency and to facilitate communication. Other agencies, whether within or outside Region 2, may elect to use the ESLs. We recommend directly contacting the known or likely overseeing agency to find out what screening levels they use. The ESL User's Guide Chapter 1 provides a brief introduction to other agency screening levels used in California (e.g., USEPA RSLs and DTSC-modified SLs).

The conceptual site model used to determine the ESLs is applicable to many sites throughout California. In general, the ESLs could be used at any site, provided all stakeholders agree. The primary suitability issues for application to different areas of the state are related to the fate and transport aspects, particularly soil leaching to groundwater. As described in ESL User's Guide Chapter 9, the modeled scenario

includes a one-meter clean sand layer between the overlying contaminated sand layer and underlying groundwater. For sites where the separation distance between soil contamination and groundwater is significantly greater than one meter or the soil type is predominantly fine-grained, application of the soil leaching ESLs can be overly conservative.

#### **9. Are the ESLs applicable to petroleum underground storage tank sites?**

Petroleum releases from underground storage tanks (USTs) must be evaluated using the State Water Resource Control Board's Low-Threat Underground Storage Tank (UST) Case Closure Policy. The ESLs may be used at such sites to screen for constituents not addressed by the Policy.

#### **10. Does the Regional Water Board re-open cases because the ESLs changed?**

In general, we do not casually re-open cases. However, Regional Water Board staff may re-open any case if data indicates that residual contamination poses an unacceptable risk to public safety, health, or the environment or if previously undetected contamination is discovered. Examples of situations where a case may be re-opened include:

- a) An environmental site assessment reveals that contamination remains at the property at concentrations that are no longer considered protective; or
- b) Data from a nearby, open case suggests contamination has migrated and is significantly impacting offsite receptors.

A case brought to the attention of Regional Water Board staff will be re-evaluated to determine whether it should be re-opened. Decisions will be made only after thorough review by the case manager and supervisor.

Currently, Regional Water Board staff are considering whether closed TCE cases should be re-evaluated for potential re-opening. At this time, there is no schedule for such an effort.

#### **11. Can the ESLs be used to determine when spill reporting to an agency is necessary?**

The ESLs are not intended to be used for determining when the presence of contamination warrants reporting of a spill to an agency. In California, the requirements for spill reporting generally are based on the quantity of the release, not a concentration. We recommend reviewing the [Governor's Office of Emergency Services Spill Release Reporting webpage](#). This webpage includes a list of essential documents that provide guidance regarding spill notification and the types of releases that are reportable. Alternatively, consult an environmental attorney.

#### **12. Can the ESLs be used to determine whether import fill soil is clean?**

No. Clean fill soil is defined as natural materials (e.g., soil, clay, silt, sand, gravel, rock, or a mixture or combination of such materials) that have concentrations of naturally occurring chemicals (e.g., metals) at or below background levels at the

receiving site while concentrations of man-made chemicals are absent. Clean fill soil is also free of trash or debris.

See also FAQ #13.

### **13. Can the ESLs be used to evaluate marginally contaminated soil for on-site reuse?**

Partially. The ESLs do not consider all potential exposure pathways (e.g., surface water transport of contaminants in the dissolved phase or as particulates) so any such use would need to be supplemented with consideration of additional aspects (e.g., erosion control for the surface water pathway; location of wetland, sensitive environments, jurisdictional waters of the State or US, habitats, and potential presence of special status species/habitats; ecological risk assessment). Regional Water Board staff currently is evaluating the development of a technical memorandum on the topic. Previous guidance on this topic *Draft Technical Resource Document: Technical Resource Document – Characterization and Reuse of Petroleum Hydrocarbon Impacted Soil as Inert Waste* dated October 20, 2006 is no longer current. In the interim, staff will consider such proposals on a site-specific basis.

### **14. Do the ESLs have to be used as cleanup levels?**

Setting cleanup levels is detailed in Section 4.25.2.3 of the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan; Regional Water Board 2017b). Cleanup levels are approved on a case-by-case basis by the Regional Water Board. Proposed final cleanup levels are based on a discharger-developed feasibility study of cleanup alternatives that compares effectiveness, cost, time to achieve cleanup standards, and a risk assessment to determine impacts on beneficial uses, human health, and the environment. Cleanup levels must also take into account the mobility and volume of pollutants. Proposed cleanup levels can differ from the ESLs provided: (1) they are adequately supported by a site-specific risk assessment or other evaluation or, alternatively, (2) that a feasibility analysis demonstrates it is not possible to clean up to ESLs. For all sites performing human health risk assessments, an alternative with an excess cancer risk of 1 in 1,000,000 ( $10^{-6}$ ) or less must be considered.

## **C. HUMAN HEALTH EXPOSURE QUESTIONS**

### **15. Why did the hierarchy for human health toxicity criteria change from the 2016 ESLs?**

In the 2019 ESL update, the toxicity value hierarchy described in ESL User's Guide Chapter 3 was synchronized with the new toxicity criteria regulation by DTSC. The citation is California Code of Regulations (CCR), Title 22, Division 4.5, sections 68400.5, 69020-69022 ("Toxicity Criteria for Human Health Risk Assessment"), effective September 4, 2018.

Prior versions of the ESLs employed a slightly different hierarchy based on a variation of the USEPA Superfund Toxicity Criteria Hierarchy (USEPA 2003b,

USEPA 2013a). The Superfund hierarchy consists of seven tiers: (1) IRIS values; (2) PPRTVs; (3) ATSDR values; (4) OEHHA values; (5) PPRTV screening toxicity values (in PPRTV appendices); (6) USEPA Health Effects Assessment Summary Table (HEAST); and (7) other sources. The previous ESL hierarchy followed the Superfund hierarchy except when OEHHA values were more stringent than values in Tiers 1 through 3, in which case the OEHHA values were prioritized. In the new hierarchy, only those OEHHA values meeting the CCR requirements are prioritized. Further information on the regulation is provided in the Final Statement of Reasons (DTSC 2018).

#### **16. Can the Tapwater ESLs be used for evaluating construction worker exposure to groundwater?**

No. Applying the Tapwater ESLs to a construction worker scenario would be overly conservative. A construction worker likely would be seeking to avoid groundwater contact (especially ingestion of groundwater). Moreover, it is generally considered unsafe construction practice to allow workers to enter excavations with significant accumulated water due to geotechnical stability concerns (e.g., sidewall collapse). In contrast, the Tapwater ESLs consider exposure via ingestion, inhalation, and dermal exposure due to the use groundwater for drinking and showering.

For situations where, remaining concentrations of contaminants are significant, then a site-specific evaluation could be performed. Such an evaluation might include a risk evaluation for the inhalation or dermal exposure routes. Keep in mind that inhalation exposure is possible in a trench but dispersion in open air above the trench or in a larger excavation is expected to sharply and rapidly decrease potential exposure concentrations.

#### **17. Why are the 2019 Vapor Intrusion ESLs for subslab/soil gas and groundwater lower than the 2016 ESLs?**

Regional Water Board staff have found that VI is occurring at some of our sites at levels that indicate our previous VI ESLs were not sufficiently protective for all buildings. The previous groundwater and subslab/soil gas VI ESLs were based on attenuation factors (AFs) developed using the USEPA (2004) version of the Johnson & Ettinger Model (JEM). The typical practice has been to use the JEM to estimate site-specific AFs, but rarely have the model predictions been verified. Consequently, there are little or no data confirming the protectiveness of the previously-used AFs. In addition, recent publications have highlighted vapor transport directly into buildings via vapor conduit preferential pathways (e.g., sewer airspace, utility conduit airspace) not considered in the current VI models. Therefore, to ensure protectiveness and adequate evaluations, the 2019 ESLs employ the more stringent AFs recommended by USEPA (2015a) which are based on an evaluation of the USEPA final empirical Vapor Intrusion Database (USEPA 2012c). These attenuation factors are based on statistical analysis of empirical data collected from many sites across the US. Moreover, the USEPA database and report has undergone peer review. Nearly 80% of the subslab soil gas attenuation factors currently recommended by other states are at least as stringent as USEPA.

## **18. Did the ESL Team consider using VI attenuation factors based on California data?**

The ESL Team has evaluated the electronically available VI sampling data available in GeoTracker. Most data in GeoTracker is in PDF format and would require a significant investment of time to extract the data. We also suspect that there will be a limited amount historical data that meets the data quality objectives for determining attenuation factors. Recent updates to GeoTracker and the use of sampling recommendations provided in the pending CalEPA Supplemental Vapor Intrusion Guidance will increase the likelihood that future GeoTracker data can be used to determine California-specific AFs.

In addition, we reviewed the recent conference paper “Empirical Analysis of Vapor Intrusion Attenuation Factors for Sub-Slab and Soil Vapor – An Updated Assessment for California Sites” (the “article”) and corresponding database (Ettinger et al. 2018). The database includes compiled paired indoor air and soil gas/subslab soil gas data from several California cleanup sites. Several different soil gas/subslab soil gas attenuation factors (ranging from 0.0014 to 0.0046) were calculated using subsets of the data (e.g. subslab vs. soil gas samples or samples from residential vs. commercial buildings).

The article’s AFs may underrepresent a certain subset of residential buildings captured in the USEPA database that are more prone to VI (e.g. buildings with basements, aged or damaged buildings with compromised slabs). In addition, the database does not contain enough data to conclusively determine that AFs less stringent than USEPA are sufficiently protective for use as generic AFs in California. Use of these values as the generic AF for VI subslab/soil gas screening levels is not appropriate without further data, evaluation, and justification. However, these results suggest there is value to continuing to compile VI data into a database for future evaluation.

The following reflects the considerations by the ESL Team in making this determination:

- Appropriate Application of USEPA Subslab to Indoor Air AF – USEPA’s default subslab to indoor air AF (0.03) was calculated using sampling data from 218 residential buildings with slab foundations. This type of building is expected to provide the least amount of vapor attenuation (particularly for buildings with basements). Therefore, this AF is expected to be the most protective and appropriate for initial screening at buildings where building design, use, and condition has not been determined.
- Article’s Subslab to Indoor Air AF – The paper presents a subslab to indoor air AF (0.0026) using data from 65 total buildings of various designs and uses (residential, commercial, industrial, school). Only 20 of those buildings are residential.
- Article’s Soil Gas to Indoor Air AF – The paper presents a soil gas to indoor air AF (0.0016) using data from 82 total buildings of various designs and uses (residential, commercial, industrial, school) with either crawlspace or slab

foundations. Only 31 of those buildings are residential buildings and 11 of those 31 have slab foundations.

- Article's Lack of AFs for Specific Building Types – The article did not include calculations of AFs for specific building types (e.g. residential buildings with crawlspaces, commercial buildings with slabs). Presumably, this is because there are less than 25 buildings of any one building type. Based on this limited dataset, there is insufficient data to definitively determine if there is a difference in attenuation for different building types.

#### **19. Why are the subslab ESLs the same as soil gas ESLs? Shouldn't there be some attenuation as VOCs migrate from deeper soils?**

The subslab/soil gas ESLs conservatively assume that attenuation only occurs as subslab soil gas moves into the building and is diluted by mixing with indoor air. While there can be additional attenuation as vapors diffuse through the soil from a deeper contaminated soil or groundwater (primarily due to soil moisture), there are other factors that can result in less attenuation than otherwise expected through the soil profile:

- The slab capping effect results from the presence of concrete slabs or buildings that limit VOC release to the atmosphere. Soil gas concentration profiles beneath slabs or buildings have less attenuation than the areas surrounding buildings. See User's Guide Chapter 5 for further information.
- A low soil moisture content zone that enhances vapor transport can develop beneath buildings because the building limits rainwater infiltration.
- Further, significant attenuation for coarse-grained soils (sand or gravel) is not usually observed unless there is significant soil moisture (nearly saturated conditions) or the thickness of the vadose zone above the contaminated soil or groundwater is great.

Consequently, we chose to apply the same attenuation factor to non-subslab soil gas and renamed the soil gas ESLs to subslab/soil gas ESLs. In addition, see Appendix A of USEPA (2015a) regarding why USEPA chose to apply the subslab AF is applied to exterior soil gas (soil gas outside the building footprint).

#### **20. Why are there no Soil VI ESLs?**

VI ESLs for soil are not developed because of the uncertainty associated with the partitioning equations and the potential loss of volatiles during sample collection, preservation, and analysis (DTSC 2011b; USEPA 2014e, USEPA 2015a). Loss of VOCs from soil samples in this manner is a particular concern in samples collected before use of USEPA Method 5035 (e.g., DTSC 2004) for field preservation. Soil matrix data are not considered a primary line of evidence and should never be used as the sole line of evidence for assessing VI. Per USEPA (2015a), non-detect soil



data for VFCs cannot be used to conclude the absence of VFCs, and therefore in turn cannot be used to conclude no potential for VI.

**21. Can fate and transport models like the USEPA Johnson and Ettinger model be used to evaluate vapor intrusion?**

Fate and transport models are not considered appropriate during the early screening phase of a project when the site is not adequately characterized and information about the condition and operation of existing buildings typically is limited. Models should be used with caution given that current models do not address how buildings change over time due to modifications/renovations, damage or operational changes (e.g., new HVAC, opening of windows and doors). Moreover, current models do not consider vapor conduit pathways such as sewer/utility conduit air VI. Further information is provided in User's Guide Chapter 5.

## **D. ECOTOXICITY QUESTIONS**

**22. Why are site-specific values used as aquatic habitat goals for some chemicals?**

For commonly encountered chemicals lacking promulgated ecological toxicity criteria, the ESLs employ values derived from published data or databases (e.g., USEPA ECOTOXicology knowledgebase or ECOTOX) or values derived from site-specific toxicity testing. These chemicals are identified in ESL User's Guide Section 7.3 along with a discussion of the uncertainties associated with using these values as screening levels. Examples of the former include MTBE and 1,2,3-trichloropropane. Examples of the latter include petroleum mixtures (e.g., petroleum-gasoline since 2003, petroleum-HOPs since 2019 though previously HOPs were evaluated in conjunction with petroleum-diesel). Employing these values is considered a practical alternative to requiring all sites with pollution near a surface water body to conduct toxicity testing. As new information becomes available, these values can be revised. Alternative screening levels can always be proposed for regulatory oversight agency consideration.

## **E. CHEMICAL-SPECIFIC QUESTIONS**

**23. Asbestos: Is there an ESL for asbestos in soil?**

The ESLs are designed for chemicals known to be common contaminants found in subsurface soils and groundwater at cleanup sites. Since the hazards posed by airborne asbestos fibers differ from those of typical chemicals addressed in the ESLs, asbestos is not included in the ESLs. Information regarding the regulation of airborne asbestos is available from the [Air Resources Board](#). Information regarding managing asbestos hazardous waste is available from the [Department of Toxic Substances Control](#).

**24. Arsenic: Why are risk-based ESLs for arsenic in soil published when those concentrations can be significantly lower than naturally occurring background concentrations?**

The risk-based ESLs are calculated using currently accepted methodologies and inputs. Background levels are not considered in the calculation of the ESLs. Background levels vary from site to site or even within a site; there is no single value for arsenic applicable throughout the Bay Area. As discussed in ESL User's Guide Section 12.4, consideration of background is carried out separately as part of the overall site-specific risk assessment.

**25. Chromium: Why are there no ESLs for total chromium?**

There is no set ratio between the different forms of chromium in the environment and use of a total chromium screening levels derived based on a fixed ratio of different forms of chromium gives a false sense of security. Instead, the ESLs include risk-based soil screening levels for chromium III (trivalent chromium) and chromium VI (hexavalent chromium), which are both naturally occurring forms of chromium and inter-convertible in the environment (OEHHA 2011). Chromium VI is a carcinogen and is considered to have a mutagenic mode of action (USEPA 2005; see User's Guide Section 3.4.7). Previous versions of the ESLs included direct contact soil values for total chromium based on the following:

- Assumption of chromium VI: chromium III ratio of 1:6 – This was done in the 2001 ESLs, and discontinued beginning with the 2003 ESLs.
- Substitution of a mean chromium background value (58 mg/kg) from Analysis of Background Distributions of Metals in the Soil at Lawrence Berkeley National Laboratory (Lawrence Berkeley National Laboratory 2002). This was done in the 2005 ESLs, and discontinued with the November 2007 ESLs (Revised May 2008). The evaluation of background is discussed in ESL User's Guide Section 12.4.

Therefore, we recommend that the concentration of the most toxic species (chromium VI) or both species (chromium III and VI) be measured for comparison to the individual risk-based screening levels. For older data sets where speciation of the different chromium forms was not performed, it would be prudent to conduct some sampling to ascertain the concentrations of the different forms present.

**26. Nickel: Why is the construction worker ESL for direct soil exposure to nickel lower than for the resident?**

The construction worker scenario is described in User's Guide Chapter 3. The scenario assumes a relatively short exposure period, but more intensive soil contact than for a resident. For estimating direct contact soil exposures, the ESLs use the USEPA Regional Screening Level equations, which for the resident includes the "resident soil equations" and for the construction worker includes the "construction worker soil equations for other than standard vehicle traffic (e.g., grading, tilling, excavating, dozing and wind)." The toxicity values and default exposure factors are discussed in User's Guide Chapter 3. For nickel, the difference between the

construction worker and resident ESLs has to do with the relative relationship between nickel's toxicity values for the different exposure routes (ingestion, inhalation, and dermal) and the default construction worker exposure factors that assume much more dust is generated during the more intensive soil moving activities.

Tier 1 ESLs that are driven by the construction worker soil direct contact are rarely selected as cleanup levels. Instead, soil management plans (also referred to as risk management plans) are often used to control potential risk to construction workers, and cleanup levels are based on residential soil exposure. This is an acceptable approach that may require a deed restriction to prohibit future activities inconsistent with the soil management plan.

#### **27. Petroleum Hydrocarbon Oxidation Products (HOPs): How do I analyze for this mixture?**

Measurement of HOPs concentrations consists of two steps. First analyze a sample for both TPH-diesel (C10-C28) with and without silica gel cleanup (SGC). Second, subtract the TPH-diesel with SGC result from the TPH-diesel without SGC result. In addition, if a background sample (collected from an unimpacted by petroleum contamination and with similar vegetative and hydrogeologic characteristics) has been analyzed for TPH-diesel without SGC, then that result can also be subtracted from the TPH-diesel without SGC result. This is also described in ESL User's Guide Section 4.5 and illustrated on Figure 4-3.

#### **28. Petroleum Hydrocarbon Oxidation Products (HOPs): With the new HOPs ESLs, do I have to analyze groundwater samples for extractable TPH (TPH-diesel and TPH-motor oil) both with and without silica gel cleanup?**

Not necessarily. Another option is to analyze for extractable TPH without silica gel cleanup and compare those results to the Petroleum-Diesel ESL. We also recommend consulting with the overseeing regulatory agency's case manager.

#### **29. Petroleum Mixtures: What Carbon Ranges Should I Use When Analyzing Soil or Groundwater Samples for the Petroleum Mixtures?**

Recommended carbon ranges are discussed in ESL User's Guide Section 4.5 and listed in Table 4-5 as follows:

- Gasoline – C5 to C12
- Stoddard Solvent – C7 to C12
- Jet Fuel – C9 to C16
- Diesel – C10 to C24
- HOPs – C10 to C28
- Motor Oil – C24 to C36

Recommendations for bunker fuel, crude oil, unknown mixtures, and waste oil are discussed in ESL User's Guide Sections 4.3.5 and 4.5.

**30. Tetrachloroethene (PCE): Why are the human health risk-based USEPA RSLs and ESLs for PCE different?**

The USEPA Regional Screening Levels (RSLs; USEPA 2018b) and ESLs employ different human health toxicity values for PCE. The ESLs employ a toxicity value hierarchy consistent with California Code of Regulations, Title 22, Division 4.5, sections 68400.5, 69020-69022 (“Toxicity Criteria for Human Health Risk Assessment”), effective September 4, 2018. For PCE, the OEHHA inhalation unit risk value, which is more stringent than the USEPA IRIS value, meets the requirements in the regulation therefore must be used for human health risk assessments and screening levels in California. See also FAQ #15.

**References are listed in the ESL User’s Guide.**