CALIFORNIA DEPARTMENT OF TOXIC SUBTANCES CONTROL (DTSC)
HUMAN AND ECOLOGICAL RISK OFFICE (HERO)

HUMAN HEALTH RISK ASSESSMENT (HHRA) NOTE

HERO HHRA NOTE NUMBER: 3, DTSC-modified Screening Levels (DTSC-SLs)

RELEASE DATE: June 2017 – Interim Update

ISSUE: DTSC has developed modified screening levels based on the U.S. Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for use in the human health risk assessment process at hazardous waste sites and permitted facilities. The USEPA RSLs have not been formally revised since May 2016; this June 2017 Interim Update to HHRA Note 3 is predominantly a duplication of the June 2016 version but addresses a few changes in toxicity criteria (see the What's New section). HHRA Note 3 is periodically updated and users should always check the DTSC website for the most recent versions, including other HHRA Notes. [a]

SUMMARY

In 2008, the USEPA released RSLs to replace the Preliminary Remediation Goals (PRGs) formerly available from several USEPA Regional Headquarters. HERO reviewed the differences in methodology and RSL concentrations to develop a methodology to incorporate the RSLs into HERO human health risk assessment consultation and review. In addition to updated toxicity criteria, several differences in methodology resulted in a subset of RSLs substantially higher (less protective) than the original PRGs, and resulted in HERO issuing recommendations for use of specific screening concentrations. HERO's review of the RSLs had been conducted in two phases: Phase I (soil and tap water screening levels) and Phase II (air screening levels). Initial versions of HHRA Note 3 (November 2009; May 2011) addressed a Phase I review only. A Phase II review was incorporated into the 21 May 2013 iteration of HHRA Note 3, and an additional update released 14 July 2014. In May 2015, a version of HHRA Note 3 was released incorporating review of the May 2014 through January 2015 releases of the RSL tables for soil, tap water, and air. Since May 2015, DTSC is now providing regular updates to the DTSC-SLs, tracking the updates to the USEPA RSL tables soon after their release.

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[a] https://www.dtsc.ca.gov/assessingrisk/humanrisk2.cfm

The present revision of HHRA Note 3 incorporates HERO recommendations based on review of the May 2016 release of the RSL tables. Exposure factors used in this HHRA Note 3 are consistent with the 30 September 2014 update to HERO HHRA Note 1, which incorporated much of the 6 February 2014 USEPA memorandum "*Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors.*" **For the majority of the approximately 800 listed RSL chemicals, HERO endorses the values listed in the USEPA RSL tables.** However some values listed in the USEPA RSL tables differ significantly (greater than three-fold less protective) from values calculated using CalEPA toxicity criteria and risk assessment procedures.

HERO has prepared reference Tables 1, 2, and 3 that provide recommended screening levels for compounds in soil, tap water, and air, respectively. **These DTSC-modified screening levels (DTSC-SLs) should be used in conjunction with the USEPA RSLs to evaluate chemical concentrations in environmental media at California sites and facilities.** DTSC-SLs for soil and tap water are identified when the value is at-least three-fold more stringent than the corresponding USEPA RSL, while an air DTSC-SL is identified when the DTSC-SL value is more stringent than the corresponding USEPA RSL by any degree. In addition, specific recommendations for several contaminants are discussed. Alternatively, in consultation with HERO, the USEPA on-line screening calculator can be used to calculate site-specific values using the more protective of CalEPA and USEPA toxicity values and applying assumptions consistent with HERO recommendations (e.g. route-to-route extrapolation between the oral and inhalation exposure pathways for inhalation toxicity criteria; dermal exposure to inorganic chemicals; and California-specific exposure factors).

HERO's development of DTSC-SLs for air (Table 3) included route extrapolation for chemicals lacking an inhalation toxicity value but which are identified as volatile by the USEPA RSL methodology,[b] or by DTSC's vapor intrusion guidance and accompanying screening models for vapor intrusion. For consistency with DTSC's vapor intrusion guidance and to reflect the more direct exposure to contaminants by the inhalation route, a three-fold difference *is not* utilized for volatile contaminants; instead, the DTSC-SLs listed in Table 3 are more stringent than the corresponding USEPA RSL by any degree. The USEPA Superfund hierarchy of toxicity-criteria sources provides oral toxicity values for more chemicals than California agency sources. Consequently, for

[b] In the June 2015 releases of the RSL tables, USEPA included a supplemental defining characteristic of volatile compounds. A long-standing criterion for volatility is a Henry's law constant greater than 1×10^{-5} (atmosphere-cubic meter) per mole. The supplemental criterion is a vapor pressure in excess of 1 millimeter of mercury. This criterion added approximately 100 chemicals into the class of volatile chemicals.

volatile compounds without inhalation toxicity criteria, most extrapolations to derive DTSC-SLs for air are based on the USEPA oral toxicity criteria. Toxicity values and sources are provided in Tables 1, 2, or 3 for those compounds with a recommended DTSC-SL.

WHAT'S NEW (June 2017)

- As a continuation of previous iterations of HHRA Note 3, HERO has reviewed the May 2016 RSL table updates, as well as other relevant information, including updated Cal/EPA criteria. This revised HHRA Note 3 incorporates our updated recommendations for screening levels, current as of June 2017.

- Changes from the June 2016 HHRA Note 3 are limited to updates in toxicity criteria from either USEPA or California Agency sources. New or updated toxicity criteria are incorporated for tetrachloroethylene (CAS# 126-18-4), ammonia (CAS# 7664-41-7), carbonyl sulfide (CAS# 463-58-1), ethylene oxide (CAS# 7521-8), pentabromo-6-chlorocyclohexane (CAS# 87-87-3), 1,2-dichloropropane (CAS# 78-87-5), 1,2-phenylenediamine (CAS# 95-54-5), 1,1,2-trichloro-1,2,2-trifluoroethane (CAS# 76-13-1), and N,N-dimethylaniline (CAS# 121-69-7).

- There were two analytes with new DTSC-SLs: carbonyl sulfide (in soil, tap water, and ambient air) and ammonia (in ambient air). The DTSC-SL values for tetrachloroethylene vary slightly from previous HHRA Note 3 values, but DTSC-SLs for the other compounds did not exceed the significance thresholds for identifying DTSC-SLs.

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BACKGROUND

HERO has a long history of working with the USEPA Region 9 office to integrate California-specific risk assessment concerns into the Preliminary Remediation Goal (PRG) listing and the PRG-screening risk assessment process. One example of the collaboration was the inclusion of 'Cal-modified' values into the USEPA Region 9 PRG list from 2004. In 2008, USEPA released a single set of RSL tables for national use and which replaced the USEPA Region 9 PRGs (and eliminated Cal-modified values). Since then, new USEPA RSLs have been released on a semiannual basis (Spring and Fall), and have included substantial modifications to the RSL methodology and toxicity value updates. Specific details of changes in the USEPA RSL methodology are documented in the "What's New" webpage section of the USEPA website.[c]

HERO continues the ongoing process of reviewing new values and methodologies, and their application in screening risk assessment. HERO generally has incorporated the USEPA RSL methodological changes, except as noted later in this text. For example, the dermal exposure pathway has been incorporated into the tap water RSL calculation. There now are approximately 800 elements, compounds and mixtures listed in the RSL tables. DTSC-SLs are derived for 178 unique elements, compounds, and mixtures in this iteration of HHRA Note 3.

USES OF RSLs and DTSC-SLs

Section 3.0 of the USEPA RSL Users Guide[d] lists the following uses for the RSLs:

"*These concentrations can be used for:*

- *Prioritizing multiple sites or operable units or areas of concern within a facility or exposure units*
- *Setting risk-based detection limits for contaminants of potential concern (COPCs)*
- *Focusing future site investigation and risk assessment efforts (e.g., selecting COPCs for the baseline risk assessment)*
- *Identifying contamination which may warrant cleanup*
- *Identifying sites, or portions of sites, which warrant no further action or investigation*
- *Initial cleanup goals when site-specific data are lacking"*

RSLs are <u>NOT</u> to be used to perform a human health Baseline Risk Assessment (BRA), but to assist in the tasks preceding a human health BRA.

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[c] http://www.epa.gov/risk/regional-screening-table-whats-new
[d] https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide-may-2016

In the past, the USEPA Region 9 PRGs had been used by HERO primarily at open, closing, and formerly-used Department of Defense (DoD) sites. Screening risk assessments at some non-military sites have in the past used different processes. However, the DTSC-SLs included in this report are being used, and are intended for use, at any DTSC site.

HHRA Note Number 4[e] and the PEA Guidance Manual provide the most recent guidance for use of screening levels in risk assessments. In general, HERO recommends compliance with the "basic" approach and principles outlined in Note 4. This includes the provision that USEPA RSLs and DTSC-SLs are used for screening sites as a whole, not for "screening out" individual chemicals. Ratios of the concentration of a particular chemical in a medium (e.g. soil, water, or air) to its risk-based concentration are calculated and the ratio is summed across all chemicals and media to estimate a total risk and hazard for the site. Prior to making risk management decisions based on the results of such an evaluation, it is critical that limitations associated with the use of USEPA RSLs and DTSC-SLs be carefully noted and understood. For example, the derivation of the USEPA RSLs and DTSC-SLs did not include an evaluation of the intrusion of vapors from the subsurface to indoor air (see below for a more detailed discussion of exposure pathways). The intrusion of volatile compounds from soil or groundwater to indoor air is a potentially major exposure pathway and should be evaluated. Ecological receptors were not considered in the derivation of USEPA RSLs and DTSC-SLs. The USEPA RSLs and DTSC-SLs apply only to human receptor exposure scenarios and are NOT necessarily protective of ecological receptors. The need for an ecological risk assessment should be evaluated separately.

CONCEPTUAL SITE MODEL AND INCLUDED EXPOSURE PATHWAYS

Before conducting a screening level human health risk assessment, development of a site-specific conceptual site model (CSM) or site exposure model is critical to ensure all appropriate receptors and exposure pathways are addressed by the chosen screening levels.

The risk-based residential and industrial soil screening levels consider several exposure pathways (ingestion, inhalation of particles and volatile chemicals, and dermal absorption) from each of three environmental media (soil, tap water, and air).

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[e] http://www.dtsc.ca.gov/AssessingRisk/upload/NOTE-4-HHRA-Number-4-October-2016-revision-2016-10-26-FINAL.pdf

The tap water screening levels are based on assumed domestic use of water via ingestion from drinking, inhalation of volatile chemicals generated during household use (e.g. showering, dish washing), and dermal exposure.

Although the soil and tap water screening levels account for many typical exposure pathways, they do not account for the following potential exposure pathways (for example, as discussed in the RSL User's Guide[f]):

- The residential and industrial soil RSLs do not account for exposure to indoor air vapors due to intrusion of subsurface soil gas emissions; ingestion via uptake of plants (home-grown fruits and vegetables), meat, or dairy products; or inhalation of particles (fugitive dust) generated by activities which elevate particulate emissions such as truck traffic and use of heavy equipment.

- Pathways not considered in the calculation of the tap water RSLs include subsurface vapor intrusion to indoor air from volatile compounds present in groundwater and transfer of contaminants in surface water or groundwater to aquatic organisms or terrestrial plants with subsequent ingestion by humans. The RSL on-line calculator and User's Guide do however include equations which can be used to calculate screening level fish concentrations assuming human consumption of fish. These equations do not address impacts to fish; but rather, human consumption of fish which may be contaminated. The RSL on-line calculator and User's Guide also provide equations which can be used to evaluate recreational receptor exposures to soil/sediment and surface water.

If pathways excluded from the derivation of the soil and tap water screening levels are anticipated at the site (e.g. home-grown produce consumption or excessive dust generation), an RSL- or DTSC-SL-based screening level risk evaluation may significantly underestimate risk. In addition, if there are exposure scenarios other than residential and industrial land use, a screening level risk evaluation using RSLs or DTSC-SLs may not be appropriate (e.g. sites in which trench workers may be exposed to shallow groundwater). In such cases, the evaluation of risk to human receptors at the site could proceed directly to the baseline human health risk assessment process. In other instances, the screening risk assessment may overestimate risk but in these cases, a baseline human health risk assessment will likely be necessary for site-specific risk-management decisions. For reference, HERO has compiled a summary of recommended exposure factors which may be used as default values in baseline human health risk assessments for California hazardous waste sites and permitted

[f] https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide-may-2016

facilities, DTSC HHRA Note 1[g], which is mostly consistent with the recent changes to the USEPA RSL methodology.

Additional Considerations Regarding Exposure for the Industrial Scenario

Evaluations of the industrial scenario using only the soil screening levels do not account for the following pathways: all exposures to groundwater (e.g., consumption as drinking water, vapor intrusion from ground water, or dermal contact); exposure via vapor intrusion to indoor air; exposure to contaminated surface water, and inhalation of particulates generated by activities which increase particulate levels such as truck traffic and use of heavy equipment. If these exposure pathways are significant at a site, screening risk assessment using soil screening levels is generally insufficient. In some cases it may be possible, with the cooperation of the DTSC toxicologist, to incorporate the risk from the vapor intrusion pathway into the screening risk assessment by adding the risk from this pathway into the risk estimated from the use of the soil screening levels.

The tap water RSLs and DTSC SLs are calculated using residential land use assumptions. As such, these screening levels are not reflective of potential industrial exposures and may over- or underestimate exposures via the water pathways (e.g., ingestion and dermal exposures to contaminated water, and inhalation exposure to volatile contaminants emitted into workplace air from contaminated water).

METHODOLOGY FOR THE DTSC-SLs

The process for derivation of DTSC-SLs is based on the identical computational algorithms used to derive USEPA's RSLs. To validate the process, a series of spreadsheet worksheets were populated with the RSL algorithms, USEPA exposure-parameter values, USEPA toxicity criteria, and the RSL analyte roster. Values derived in these workbooks were compared to the USEPA values downloaded from the USEPA website. Computed values matched the USEPA values for soil, tap water, and air after allowing for slight differences attributable to treatment of significant digits and rounding.

DTSC-SLs were derived by populating copies of the aforementioned spreadsheet workbooks with California exposure and toxicity factors, and DTSC-specific methods. California exposure factors are those listed in HHRA Note 1 and the PEA Guidance Manual, and many values match those used by USEPA. California toxicity factors were

[g] http://dtsc.ca.gov/AssessingRisk/upload/HHRA_Note1.pdf

obtained from the CalEPA Office of Environmental Health Hazard Assessment (OEHHA) toxicity criteria database[h] and the OEHHA chronic inhalation and chronic oral reference exposure levels (RELs).[i] In consideration of evolving methods for mutagenic carcinogens and interagency consistency, calculations for compounds identified as having a mutagenic mode of action (MMOA) utilized age-dependent adjustment factors (ADAFs) in accordance with the methods employed by the USEPA in their RSL tables. Trichloroethene (TCE) was evaluated using the combined MMOA and non-mutagen approaches as developed in the USEPA RSL methodology. Vinyl chloride was evaluated using the same vinyl-chloride-specific methodology used in the USEPA RSL tables, although the vinyl chloride methodology may be under review. Lastly and as discussed previously, for purposes of screening air contaminants, HERO recommends the use of route extrapolation—converting an oral reference dose or slope factor to an inhalation reference concentration or unit-risk factor—when an inhalation-specific toxicity value is not available.

DTSC-SLs were calculated initially for the entire roster of RSL analytes and several additional analytes. The final roster of soil and tap water DTSC-SLs (Tables 1 and 2, respectively) includes only those analytes for which the combination of California-specific exposure and toxicity factors results in a DTSC-SL that is at least three times more stringent than the corresponding USEPA RSL value. Air screening levels (Table 3) are listed when the DTSC-SL is more stringent than the corresponding RSL, regardless of degree.

SITE SCREENING – SOIL, TAP WATER, and AIR CONTAMINANTS

As discussed previously, HERO reviewed the soil, tap water, and air RSLs in a phased approach. The results presented in this version provide recommendations on the use of screening levels for soil, tap water, and air, under residential and industrial/commercial land uses.

Since May 2013, USEPA has provided two sets of tables, with RSLs based on target hazard quotients (THQ) of 1.0 and 0.1. The RSL website states that the rationale for using a THQ of 0.1 for screening is that if 10 chemicals were at a site and all narrowly passed a screening at THQ=1.0, the resulting total HI could actually be 10. In general, HERO does not recommend use of screening levels based on a THQ of 0.1. Instead, screening levels based on a target HQ of 1 should be used, and cumulative noncancer

[h] http://oehha.ca.gov/tcdb/index.asp
[i] http://www.oehha.ca.gov/air/allrels.html

hazard should be summed across all site-related contaminants, media, and exposure pathways. All discussion below relies on screening levels based on a THQ of 1.

Soil and Tap Water

While it is possible to use the USEPA website's on-line RSL calculator[j] and employ the California-recommended toxicity values and exposure factors for each exposure pathway to derive screening levels, this would be a laborious process for DTSC managers and staff, Responsible Parties, and contractors. To address this difficulty, HERO has combined the USEPA RSL methodology and values with a DTSC-specific methodology and values for all compounds in the USEPA RSL roster. HERO then identified elements, compounds and mixtures in which the soil or tap water USEPA RSLs differed significantly (i.e. greater by a factor of 3-fold or more) from the DTSC-SLs. In most cases, the differences for both media were due to toxicity value sources or the use of extrapolation from the oral to the inhalation pathway.

Users of the screening levels should be aware that the screening values are strictly risk-based. The DTSC-SLs and the tabular versions of the USEPA RSL tables do not consider external practical criteria such as analytical detection limits, naturally occurring concentrations, or physical limitations such as soil saturation (although relevant notations are provided in the USEPA RSL tables). For example, screening levels for some chemicals can exceed liquid saturation conditions (i.e., pure analyte in the soil pore space) or can exceed reasonable physical conditions in soil such as concentrations greater than 100,000 ppm (10% by weight or more). Multiple DTSC-SLs exceeded soil-saturation concentrations or a 10% by weight threshold and these are indicated in Table 1 by bold text (29 analytes) and italicizing (5 analytes), respectively. Note that the online USEPA RSL calculator has a user-selectable site-specific option to substitute saturation or threshold concentrations when the calculated RSL exceeds those physical limitations. For tap water, risk-based concentrations occasionally exceed maximum contaminant level (MCL) regulatory criteria; see item #5 in the subsequent "Discussion and Recommendations for Specific Contaminants" section.

The HERO recommendations outlined here (with the exception of the elements discussed in the following section) reflect that for the greater number of chemicals listed in the USEPA RSL tables, the USEPA soil and tap water RSLs may be used for screening-level evaluation of California sites. In addition, if volatile contaminants are present at a site, soil gas data are required to evaluate the vapor intrusion to indoor air

[j] http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

pathway. This allows a more comprehensive evaluation because the soil and tap water screening levels do not include the vapor intrusion pathway, which is often the risk driver.

Air

Subsurface vapor intrusion to indoor air from volatile compounds in soil or groundwater is a potentially major exposure pathway. The air screening levels address residential and industrial exposure scenarios, and may be used for screening contaminants in indoor air. The air screening levels for volatile chemicals also have potential applications for screening soil gas data when used in concert with an appropriate attenuation factor as described in DTSC's 2011 *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (2011 VIG).[k] DTSC-recommended default attenuation factors for preliminary screening evaluations can be found in Table 2 of DTSC's 2011 VIG. For detailed recommendations on the vapor intrusion to indoor air pathway and evaluation of soil gas and indoor air data, please consult DTSC's 2011 VIG, or contact the DTSC site toxicologist to ensure appropriate use of air screening levels on a site-specific basis.

- To facilitate site screening, HERO herein provides recommendations on use of air screening levels for chemicals identified as volatile in the USEPA RSL tables, DTSC's VIG, or DTSC's screening models for vapor intrusion, and non-volatile compounds with inhalation-based toxicity criteria (no route extrapolation). HERO's derivation is based on a comparison of the inhalation toxicity criteria used to derive the USEPA's air RSLs relative to California toxicity criteria and HERO recommendations (e.g. route-to-route extrapolation for volatile chemicals). As noted previously, screening levels for air contaminants are the more stringent of USEPA or DTSC screening values.

- For the one-hundred ten volatile chemicals that lacked inhalation toxicity criteria, HERO extrapolated oral-exposure toxicity values to derive inhalation toxicity values for use in calculating air screening levels.

[k] http://www.dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf

DISCUSSION AND RECOMMENDATIONS FOR SPECIFIC CONTAMINANTS

1. **Lead (Soil).** In 2007, CalEPA OEHHA developed a new toxicity evaluation of lead, replacing the 10 microgram per deciliter (µg/dL) threshold blood lead concentration with a source-specific "benchmark change" of 1 µg/dL.[l] One µg/dL is the estimated incremental increase in children's blood lead that would reduce Intelligence Quotient (IQ) by up to 1 point. In light of the updated CalEPA lead toxicity criterion, as well as the need for revision to ensure that the model is adequately protective of women of child-bearing age, HERO developed a new version of the DTSC LEAD RISK ASSESSMENT SPREADSHEET (LeadSpread 8; 2011).[m]

   Worksheets 1 and 2 of the LeadSpread 8 file include PRG90 calculations for residential and industrial land use scenarios, respectively. The PRG90 values represent lead concentrations in soil that will result in a 90th percentile estimate of a 1µg/dl increase in blood lead in a child or the fetus of a pregnant adult worker. While DTSC has historically used the 99th percentile estimate of blood lead concentration in the population, HERO considers the 90th percentile of the distribution appropriate for use in evaluating lead exposures with the new health-protective criterion of a 1 µg/dL *incremental increase* in blood lead. The previous benchmark targeted the total blood lead concentration, which also included contributions of lead from background sources.

   HERO applies the risk-based soil lead concentrations in a residential use (i.e., unrestricted use) scenario as an Exposure Point Concentration (EPC). A 95-percent upper confidence limit on the arithmetic mean (95% UCL) calculated to be 80 mg/kg or less for residential soil lead, or a 95% UCL of 320 mg/kg or less for industrial soil lead, would be protective of children and women of child-bearing ages, respectively. With regard to assessment of lead risk and evaluating cleanup options, if sufficient data are available, HERO recommends calculating the 95% UCL lead concentration for each exposure area. If individual samples exceed the PRG90 soil lead concentration, the exposure area as a whole might not exceed the PRG90 as long as the 95% UCL itself is below ~80 mg/kg for residential and ~320 mg/kg for industrial/commercial, and assuming hot spots are not present. If "hot spots" (i.e., geographically collocated areas of elevated concentration), or "outliers" (i.e., individual samples with elevated concentrations) are present, they must be addressed separately.

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[l] http://oehha.ca.gov/media/downloads/crnr/pbhgv041307.pdf
[m] http://www.dtsc.ca.gov/AssessingRisk/LeadSpread8.cfm

For initial site screening where data are insufficient to calculate a 95% UCL, comparison of the maximum detected concentration to the PRG90s would be appropriate. If individual sample results exceed the PRG90s, depending on site-specific conditions and sampling results, additional investigation, evaluation, and potentially remediation may be warranted to address concerns about lead exposure.

It is important to note that background exposures to lead, and media other than soil which may be impacted by lead are not considered in LeadSpread8. If lead is present at levels above background in media other than soil (e.g. water, air), or if the home grown produce pathway is anticipated at the site, please contact the HERO toxicologist. DTSC's LeadSpread model is periodically updated; users should check the DTSC website for the latest version.[n]

2. **Cadmium (Soil).** The cadmium soil and tap water RSLs based on noncancer effects were calculated using the USEPA Integrated Risk Information System (IRIS) oral reference dose (RfDo) for food (1 µg/kg-day) and water (0.5 µg/kg-day), respectively. However, the 2006 CalEPA OEHHA public health goal (PHG) for cadmium is based on a more health protective oral acceptable daily intake level than the current USEPA RfDo. Specifically, the acceptable daily dose (ADD) used by OEHHA to derive their PHG was 0.0063 µg/kg-day.

   For residential scenarios, risk-based soil concentrations based on noncancer effects are generally calculated for the first six years of childhood based on an assumption that children have higher estimated exposure rates than adults because of factors such as a lower body weight and higher soil ingestion rate. For cadmium, HERO has reviewed the CalEPA OEHHA PHG document and, at this time, we consider a 26-year adult residential scenario appropriate for calculating a risk-based soil concentration to address noncancer effects. As discussed in the PHG document, cadmium accumulates rapidly in the kidney during the first decades of life and then approaches a plateau around age 40 to 50. The PHG is derived from a daily cadmium intake based on toxicokinetic studies in adults and assumes accumulation of cadmium over approximately 50 years. The no observed adverse effect level (NOAEL) identified by OEHHA is also based on a very sensitive indicator of renal toxicity, and the ADD incorporates an overall uncertainty factor of 50. First, an uncertainty factor of 5 was used to address sensitive individuals (principally uncertainties due to limited information on the toxicokinetics of cadmium, particularly

[n] http://www.dtsc.ca.gov/assessingrisk/humanrisk2.cfm

in women). An additional uncertainty factor of 10 was used to address potential cancer risk due to oral exposure to cadmium since no oral studies were considered suitable for estimating the oral cancer potency for cadmium.

Applying the CalEPA ADD (6.3E-6 mg/kg-day) and January 2015 RSL table inhalation RfC (1E-2 µg/m^3; Source ATSDR) with a 26-year adult residential exposure scenario and DTSC default dermal exposure parameters (including GIABS=1), the DTSC-modified screening level for cadmium in residential soil, based on noncancer effects, was calculated to be 5.2 mg/kg. The DTSC-modified screening level for cadmium in industrial soil based on noncancer effects was calculated to be 7.3 mg/kg. Applying the CalEPA inhalation unit risk factor of 4.2E-3 per µg/m^3, the DTSC-modified screening levels for residential and industrial soil based on cancer are 910 mg/kg and 4000 mg/kg, respectively. Therefore, the noncancer-based values of 5.2 mg/kg and 7.3 mg/kg were selected as screening levels for cadmium in residential and industrial soil, respectively.

Please note that the DTSC-modified soil screening levels presented herein are undergoing re-evaluation. Based on newer data and potential updates to cadmium toxicity criteria, HERO's review of relevant information for this contaminant is ongoing and we plan to derive updated DTSC-modified screening levels for soil in the future. At this time we have not derived tap water screening levels for cadmium, however, we may do so as part of a future revision. Please consult with the DTSC toxicologist for sites where cadmium is a site-related contaminant in soil or water to ensure an up-to-date analysis for site conditions.

3. **Beryllium and Beryllium Compounds (Soil).** CalEPA toxicity criteria for beryllium differ from current USEPA values in some regards. For cancer, the USEPA and CalEPA's inhalation unit risk for beryllium and beryllium oxide are the same. However, CalEPA also has a separate inhalation unit risk specifically for beryllium sulfate (8.6E-1 per µg/m^3). For noncancer, the USEPA RfDo (2E-3 mg/kg-day) is 10-fold higher than the noncancer toxicity criterion used by CalEPA OEHHA to derive the PHG for beryllium and beryllium compounds (2E-4 mg/kg-day). The difference is based on agency differences in dose metrics and uncertainty adjustments applied to the same underlying primary research. In addition, the USEPA inhalation reference concentration (RfC) for beryllium and compounds (2E-2 µg/m^3) is higher than the OEHHA chronic inhalation reference level (REL) for beryllium and compounds (7E-3 µg/m^3) because OEHHA weighted the key study's critical effect as more severe than USEPA did for the same study.

For beryllium and compounds, HERO applied the CalEPA OEHHA inhalation unit risk (2.4E-3 per µg/m^3), the RfDo-equivalent from the PHG document (2E-4 mg/kg-day), the chronic REL (7E-3 µg/m^3), and DTSC default dermal exposure parameters (including GIABS=1) to derive DTSC-modified screening levels for soil. The DTSC-modified screening levels based on noncancer effects were calculated to be 15 mg/kg and 210 mg/kg for residential and industrial land use, respectively. For cancer, the DTSC-modified screening levels for beryllium and compounds in soil were calculated to be 1600 mg/kg and 6900 mg/kg under the residential and industrial land use scenarios, respectively.

For beryllium sulfate, HERO applied the CalEPA inhalation unit risk (8.6E-1 per µg/m^3) for cancer to derive DTSC-modified screening levels for soil of 4.4 mg/kg and 19 mg/kg for residential and industrial land uses, respectively. For noncancer endpoints, the DTSC-modified screening levels for beryllium sulfate and beryllium and compounds in soil are identical since the only CalEPA criterion specific for beryllium sulfate is the inhalation unit risk. Similar to cadmium above, at this time we have not derived tap water screening levels for beryllium sulfate. Please consult with the DTSC toxicologist for sites where beryllium is a site-related contaminant in water.

4. **Arsenic (Soil).** USEPA incorporates a relative bioavailability factor (RBA) into the RSL calculations for screening level concentrations for ingestion of soil-borne arsenic (a dimensionless value of 0.6, in contrast to a default value of 1.0 for all other compounds). HERO supports the use of this default RBA value for the adjustment of the ingestion of arsenic bound to soils and the DTSC-SL reflects this modification to the risk calculation. HERO has prepared HHRA Note 6 that provides recommendations for completing site-specific evaluations of the arsenic RBA in site soils.[o] Please consult with the DTSC toxicologist for sites where soil-borne arsenic is a site-related contaminant for the current recommendations for arsenic bioavailability. Note that risk-based screening-level concentrations of arsenic in soil are often below naturally occurring (background) concentrations. Consequently, HERO strongly recommends consideration of site-specific background concentrations of inorganic constituents.

5. **Screening Levels and MCLs.** As noted previously, the DTSC-SL and USEPA RSL values are derived strictly as risk-based concentrations—mathematical constructs of the exposure calculation algorithms—that may be independent of certain practical

[o] http://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-6-CAB-Method-082216.pdf

constraints (e.g., solubility, detection limits, or background concentrations). Additionally, there may be risk management considerations (such as regulatory thresholds) that affect decision-making for contaminated sites outside of the risk assessment process. MCLs are enforceable regulatory criteria for protection of the drinking water resource and in several examples are at concentrations lower than risk-based screening levels. Table 4 presents the roster of analytes for which the DTSC-SL and USEPA RSL screening values exceed the California MCL regulatory criteria. These particular MCL criteria may need additional consideration during scoping for remedial or environmental investigations.

TABULAR RESULTS

HERO has calculated DTSC-SLs for all chemicals on the USEPA RSL roster and several additional analytes. However, not all DTSC-modified values for soil or tap water differ significantly (more than three-fold) from the USEPA-derived version (e.g., when identical or similar toxicity factors or exposure factors are used). Screening concentrations for air were derived for all of the volatile chemicals and several other airborne contaminants, and a DTSC-SL is listed when the value is more stringent, by any degree, than the corresponding USEPA RSL value.

Supporting documentation of the computations for the roster of analytes with a DTSC-SL are provided in separate media-specific Appendices A through C (soil, tap water, and air, respectively). The appendices present the screening levels side-by-side, based on the USEPA and the DTSC-modified approaches. These are available for download from the DTSC website. These documentation files provide the exposure factors, exposure algorithms, toxicity values, and computed screening-level concentrations for soil, tap water, and air, for exposures via ingestion, dermal contact, and inhalation.

Alternatively, the USEPA on-line screening calculator available at the USEPA RSL website[p] can be used to calculate site-specific values using the more protective of CalEPA or USEPA toxicity values, applying assumptions consistent with HERO recommendations (e.g. route-to-route extrapolation between the oral and inhalation exposure pathways where no toxicity value is available for the inhalation route of exposure but an oral toxicity value is available), and site-specific values as agreed upon in consultation with HERO.

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[p] https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

Table 1, Screening Levels for Soil

Table 1 presents DTSC-modified screening values for soil that are at least three-times more stringent than the corresponding USEPA value, and includes the corresponding toxicity factors. For this roster of analytes (i.e., with at least one DTSC-SL), available USEPA RSL values are also provided for receptors or endpoints that lack a designated DTSC-SL, for table completeness. A Microsoft Excel® version of Table 1 is available for download from the DTSC website.

Table 2, Screening Levels for Tap Water

Table 2 presents DTSC-modified screening values for tap water that are at least three-times more stringent than the corresponding USEPA value, and includes the corresponding toxicity factors. For this roster of analytes (i.e., with at least one DTSC-SL), available USEPA RSL values are also provided for receptors or endpoints that lack a designated DTSC-SL, for table completeness. A Microsoft Excel® version of Table 2 is available for download from the DTSC website.

Table 3, Screening Levels for Air

Table 3 presents DTSC-modified screening values for air contaminants that are more stringent than the corresponding USEPA RSL value, and includes the corresponding toxicity factors. For this roster of analytes (i.e., with at least one DTSC-SL), available USEPA RSL values are also provided for receptors or endpoints that lack a designated DTSC-SL, for table completeness. A Microsoft Excel® version of Table 3 is available for download from the DTSC website.

Table 4, Maximum Contaminant Levels (MCLs)

Table 4 presents the roster of analytes for which the DTSC-SL and USEPA RSL screening values exceed the California MCL regulatory criteria. A Microsoft Excel® version of Table 4 is available for download from the DTSC website.

Appendices A through C

Computational details for the derivation of screening levels are provided as Appendix A (soil), Appendix B (tap water), and Appendix C (air). The appendices are provided as Microsoft Excel® files, available for download from the DTSC website.

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Table 1. DTSC-Recommended Screening Levels for Soil[a]

Analyte	CAS #	Screening Levels for Residential Soil (mg/kg)				Screening Levels for Commercial/Industrial Soil (mg/kg)				Toxicity Factor for DTSC-SLs							
		Cancer Endpoint		Noncancer Endpoint		Cancer Endpoint		Noncancer Endpoint		Oral Slope Factor		Inhalation Unit Risk		Reference Dose - Oral		Reference Concentration	
		Final Value	Source	Final Value	Source	Final Value	Source	Final Value	Source	SFo (mg/kg-d)$^{-1}$	Source	IUR ($\mu g/m^3$)$^{-1}$	Source	RfDo (mg/kg-d)	Ref.	RfC or REL ($\mu g/m^3$)	Source
USEPA RSL Analytes																	
Acrylamide	79-06-1	2.6E-02	DTSC	1.3E+02	USEPA	3.3E-01	DTSC	1.6E+03	USEPA	4.5E+00	OEHHA	1.3E-03	OEHHA	2.0E-03	IRIS	6.0E+00	IRIS
Acrylonitrile	107-13-1	6.8E-02	DTSC	1.6E+01	USEPA	3.0E-01	DTSC	6.8E+01	USEPA	1.0E+00	OEHHA	2.9E-04	OEHHA	4.0E-02	ATSDR	2.0E+00	IRIS
Arsenic, Inorganic	7440-38-2	1.1E-01	DTSC	4.0E-01	DTSC	3.6E-01	DTSC	4.2E+00	DTSC	9.5E+00	OEHHA PHG	3.3E-03	OEHHA	3.5E-06	OEHHA	1.5E-02	OEHHA
Benzaldehyde	100-52-7	4.7E+01	DTSC	**7.8E+03**	USEPA	2.1E+02	DTSC	**3.0E+04**	DTSC	4.0E-03	PPRTV	1.0E-06	Route	1.0E-01	IRIS	4.0E+02	Route
Benzene	71-43-2	3.3E-01	DTSC	1.1E+01	DTSC	1.4E+00	DTSC	4.7E+01	DTSC	1.0E-01	OEHHA	2.9E-05	OEHHA	4.0E-03	IRIS	3.0E+00	OEHHA
Benzenethiol	108-98-5	--	--	7.8E+01	USEPA	--	--	2.7E+02	DTSC	--	--	--	--	1.0E-03	PPRTV	4.0E+00	Route
Benzidine	92-87-5	5.3E-04	USEPA	1.9E+02	USEPA	3.0E-03	DTSC	2.5E+03	USEPA	5.0E+02	OEHHA	1.4E-01	OEHHA	3.0E-03	IRIS	--	--
Beryllium and compounds	7440-41-7	1.6E+03	USEPA	1.5E+01	DTSC	6.9E+03	USEPA	2.1E+02	DTSC	--	--	2.4E-03	IRIS	2.0E-04	OEHHA PHG	7.0E-03	OEHHA
Bromodichloromethane	75-27-4	3.0E-01	USEPA	2.8E+02	DTSC	1.3E+00	USEPA	**1.3E+03**	DTSC	6.2E-02	IRIS	3.7E-05	OEHHA	2.0E-02	IRIS	8.0E+01	Route
Bromoform	75-25-2	2.0E+01	USEPA	**1.6E+03**	USEPA	8.7E+01	USEPA	**3.0E+03**	DTSC	7.9E-03	IRIS	1.1E-06	IRIS	2.0E-02	IRIS	8.0E+01	Route
Butadiene, 1,3-	106-99-0	1.4E-02	DTSC	1.8E+00	USEPA	6.2E-02	DTSC	7.7E+00	USEPA	6.0E-01	OEHHA	1.7E-04	OEHHA	--	--	2.0E+00	IRIS
Butanol, N-	71-36-3	--	--	**7.8E+03**	USEPA	--	--	**3.7E+04**	DTSC	--	--	--	--	1.0E-01	IRIS	4.0E+02	Route
Butylbenzene, n-	104-51-8	--	--	**1.2E+03**	DTSC	--	--	**6.4E+03**	DTSC	--	--	--	--	5.0E-02	PPRTV	2.0E+02	Route
Butylbenzene, sec-	135-98-8	--	--	**2.2E+03**	DTSC	--	--	**1.2E+04**	DTSC	--	--	--	--	1.0E-01	sPPRTV	4.0E+02	Route
Butylbenzene, tert-	98-06-6	--	--	**2.2E+03**	DTSC	--	--	**1.2E+04**	DTSC	--	--	--	--	1.0E-01	sPPRTV	4.0E+02	Route
Cadmium (Diet)	7440-43-9 (diet)	2.1E+03	USEPA	5.2E+00	DTSC	9.3E+03	USEPA	7.3E+00	DTSC	--	--	1.8E-03	IRIS	6.3E-06	OEHHA PHG	1.0E-02	ATSDR
Carbon Tetrachloride	56-23-5	9.9E-02	DTSC	1.0E+02	USEPA	4.3E-01	DTSC	**5.8E+02**	USEPA	1.5E-01	OEHHA	4.2E-05	OEHHA	4.0E-03	IRIS	1.0E+02	IRIS
Carbonyl Sulfide	463-58-1	--	--	6.8E+00	DTSC	--	--	2.9E+01	DTSC	--	--	--	--	--	--	1.0E+01	OEHHA
Chlordane	12789-03-6	4.4E-01	DTSC	3.5E+01	USEPA	1.5E+00	DTSC	4.5E+02	USEPA	1.3E+00	OEHHA	3.4E-04	OEHHA	5.0E-04	IRIS	7.0E-01	IRIS
Chloro-2-methylaniline, 4-	95-69-2	5.4E+00	USEPA	1.9E+02	USEPA	5.5E+00	DTSC	2.5E+03	USEPA	2.7E-01	OEHHA	7.7E-05	OEHHA	3.0E-03	sPPRTV	--	--
Chloroacetaldehyde, 2-	107-20-0	5.4E-01	DTSC	--	--	2.4E+00	DTSC	--	--	2.7E-01	sPPRTV	6.8E-05	Route	--	--	--	--
Chlorobutane, 1-	109-69-3	--	--	2.7E+02	DTSC	--	--	**1.2E+03**	DTSC	--	--	--	--	4.0E-02	PPRTV	1.6E+02	Route
Chlorotoluene, o-	95-49-8	--	--	4.8E+02	DTSC	--	--	**2.6E+03**	DTSC	--	--	--	--	2.0E-02	IRIS	8.0E+01	Route
Chlorotoluene, p-	106-43-4	--	--	**4.4E+02**	DTSC	--	--	**2.3E+03**	DTSC	--	--	--	--	2.0E-02	sPPRTV	8.0E+01	Route
Chromium(III), Insoluble Salts	16065-83-1	--	--	3.6E+04	DTSC	--	--	*1.7E+05*	DTSC	--	--	--	--	1.5E+00	IRIS	--	--
Crotonaldehyde, trans-	123-73-9	8.7E-02	DTSC	7.8E+01	USEPA	3.8E-01	DTSC	2.6E+02	DTSC	1.9E+00	HEAST	4.8E-04	Route	1.0E-03	PPRTV	4.0E+00	Route
Cyanides	Cyanides	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
~Cyanogen	460-19-5	--	--	4.5E+00	DTSC	--	--	2.0E+01	DTSC	--	--	--	--	1.0E-03	IRIS	4.0E+00	Route
~Cyanogen Bromide	506-68-3	--	--	3.1E+02	DTSC	--	--	1.3E+03	DTSC	--	--	--	--	9.0E-02	IRIS	3.6E+02	Route
~Cyanogen Chloride	506-77-4	--	--	3.3E+02	DTSC	--	--	1.5E+03	DTSC	--	--	--	--	5.0E-02	IRIS	2.0E+02	Route
~Potassium Silver Cyanide	506-61-6	--	--	3.9E+02	USEPA	--	--	1.5E+03	DTSC	--	--	--	--	5.0E-03	IRIS	--	--
~Silver Cyanide	506-64-9	--	--	7.8E+03	USEPA	--	--	2.9E+04	DTSC	--	--	--	--	1.0E-01	IRIS	--	--
Dibromobenzene, 1,3-	108-36-1	--	--	3.1E+01	USEPA	--	--	1.1E+02	DTSC	--	--	--	--	4.0E-04	sPPRTV	1.6E+00	Route
Dibromobenzene, 1,4-	106-37-6	--	--	7.8E+02	USEPA	--	--	2.9E+03	DTSC	--	--	--	--	1.0E-02	IRIS	4.0E+01	Route
Dibromochloromethane	124-48-1	9.5E-01	DTSC	4.7E+02	DTSC	4.2E+00	DTSC	**2.5E+03**	DTSC	8.4E-02	IRIS	2.1E-05	Route	2.0E-02	IRIS	8.0E+01	Route
Dibromoethane, 1,2-	106-93-4	3.7E-02	USEPA	7.2E+00	DTSC	1.6E-01	USEPA	3.1E+01	DTSC	2.0E+00	IRIS	6.0E-04	IRIS	9.0E-03	IRIS	8.0E-01	OEHHA
Dichlorobenzidine, 3,3'-	91-94-1	1.2E+00	USEPA	--	--	1.2E+00	DTSC	--	--	1.2E+00	OEHHA	3.4E-04	OEHHA	--	--	--	--
Dichloroethane, 1,1-	75-34-3	3.6E+00	USEPA	1.6E+03	DTSC	1.6E+01	USEPA	**7.2E+03**	DTSC	5.7E-03	OEHHA	1.6E-06	OEHHA	2.0E-01	PPRTV	8.0E+02	Route
Dichloroethylene, 1,2-cis-	156-59-2	--	--	1.9E+01	DTSC	--	--	8.6E+01	DTSC	--	--	--	--	2.0E-03	IRIS	8.0E+00	Route
Dichloroethylene, 1,2-trans-	156-60-5	--	--	1.3E+02	DTSC	--	--	6.0E+02	DTSC	--	--	--	--	2.0E-02	IRIS	8.0E+01	Route
Dichloropropane, 1,3-	142-28-9	--	--	4.2E+02	DTSC	--	--	**2.2E+03**	DTSC	--	--	--	--	2.0E-02	PPRTV	8.0E+01	Route
Dichloropropene, 1,3-	542-75-6	5.8E-01	DTSC	7.3E+01	USEPA	2.6E+00	DTSC	3.1E+02	USEPA	9.1E-02	OEHHA	1.6E-05	OEHHA	3.0E-02	IRIS	2.0E+01	IRIS
Dimethylaniline, N,N-	121-69-7	2.6E+01	USEPA	1.6E+02	USEPA	3.9E+01	DTSC	7.5E+02	DTSC	2.7E-02	PPRTV	6.8E-06	Route	2.0E-03	IRIS	8.0E+00	Route
Epichlorohydrin	106-89-8	1.8E+00	DTSC	1.9E+01	USEPA	8.2E+00	DTSC	8.3E+01	USEPA	8.0E-02	OEHHA	2.3E-05	OEHHA	6.0E-03	PPRTV	1.0E+00	IRIS
Ethyl Ether	60-29-7	--	--	2.3E+03	DTSC	--	--	**1.1E+04**	DTSC	--	--	--	--	2.0E-01	IRIS	8.0E+02	Route
Furans	Furans	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
~Furan	110-00-9	--	--	9.6E+00	DTSC	--	--	4.4E+01	DTSC	--	--	--	--	1.0E-03	IRIS	4.0E+00	Route
Hexachlorobutadiene	87-68-3	1.2E+00	USEPA	**7.8E+01**	USEPA	5.3E+00	USEPA	**1.6E+02**	DTSC	7.8E-02	IRIS	2.2E-05	IRIS	1.0E-03	PPRTV	4.0E+00	Route
Hexachlorocyclohexane, Technical	608-73-1	3.0E-01	USEPA	--	--	3.7E-01	DTSC	--	--	4.0E+00	OEHHA	1.1E-03	OEHHA	--	--	--	--
Isobutyl Alcohol	78-83-1	--	--	**2.3E+04**	USEPA	--	--	***1.1E+05***	DTSC	--	--	--	--	3.0E-01	IRIS	1.2E+03	Route
Lead Compounds	Lead Compounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
~Lead and Compounds[b]	7439-92-1	--	--	8.0E+01	DTSC			3.2E+02	DTSC	--	--	--	--	--	--	--	--
~Lead subacetate	1335-32-6	1.4E+01	DTSC	--	--	3.9E+01	DTSC	--	--	3.8E-02	OEHHA	1.1E-05	OEHHA	--	--	--	--
~Tetraethyl Lead	78-00-2	--	--	7.3E-04	DTSC	--	--	3.3E-03	DTSC	--	--	--	--	1.0E-07	IRIS	4.0E-04	Route
Lewisite	541-25-3	--	--	3.9E-01	USEPA	--	--	1.6E+00	DTSC	--	--	--	--	5.0E-06	PPRTV	2.0E-02	Route
Manganese (Non-diet)	7439-96-5 (non-diet)	--	--	1.8E+03	USEPA	--	--	6.9E+03	DTSC	--	--	--	--	2.4E-02	non-diet; IRIS	9.0E-02	OEHHA
Mercury Compounds	Mercury Compounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
~Mercuric Chloride (and other Mercury salts)	7487-94-7	--	--	2.3E+01	USEPA	--	--	6.9E+01	DTSC	--	--	--	--	1.6E-04	OEHHA REL	3.0E-02	OEHHA
~Mercury (elemental)	7439-97-6	--	--	1.0E+00	DTSC	--	--	**4.5E+00**	DTSC	--	--	--	--	1.6E-04	OEHHA REL	3.0E-02	OEHHA
Methyl Acetate	79-20-9	--	--	2.4E+04	DTSC	--	--	***1.3E+05***	DTSC	--	--	--	--	1.0E+00	sPPRTV	4.0E+03	Route
Methylene Chloride	75-09-2	1.9E+00	DTSC	3.5E+02	USEPA	2.4E+01	DTSC	3.2E+03	USEPA	1.4E-02	OEHHA	1.0E-06	OEHHA	6.0E-03	IRIS	6.0E+02	IRIS
Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	7.8E-02	DTSC	1.3E+02	USEPA	9.9E-01	DTSC	1.6E+03	USEPA	1.5E+00	OEHHA	4.3E-04	OEHHA	2.0E-03	PPRTV	--	--
Methylenediphenyl Diisocyanate	101-68-8	--	--	*1.1E+05*	DTSC	--	--	*4.8E+05*	DTSC	--	--	--	--	--	--	8.0E-02	OEHHA
Methylstyrene, Alpha-	98-83-9	--	--	**5.5E+03**	USEPA	--	--	**1.3E+04**	DTSC	--	--	--	--	7.0E-02	HEAST	2.8E+02	Route
Mineral oils	8012-95-1	--	--	**1.6E+04**	DTSC	--	--	**7.2E+04**	DTSC	--	--	--	--	3.0E+00	PPRTV	1.2E+04	Route

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Table 1. DTSC-Recommended Screening Levels for Soil[a]

Analyte	CAS #	Screening Levels for Residential Soil (mg/kg)				Screening Levels for Commercial/Industrial Soil (mg/kg)				Toxicity Factor for DTSC-SLs							
		Cancer Endpoint		Noncancer Endpoint		Cancer Endpoint		Noncancer Endpoint		Oral Slope Factor		Inhalation Unit Risk		Reference Dose - Oral		Reference Concentration	
		Final Value	Source	Final Value	Source	Final Value	Source	Final Value	Source	SFo (mg/kg-d)$^{-1}$	Source	IUR ($\mu g/m^3$)$^{-1}$	Source	RfDo (mg/kg-d)	Ref.	RfC or REL ($\mu g/m^3$)	Source
Nickel Hydroxide	12054-48-7	1.5E+04	USEPA	8.2E+02	USEPA	6.4E+04	USEPA	3.1E+03	DTSC	--	--	2.6E-04	OEHHA	1.1E-02	OEHHA	1.4E-02	OEHHA
Nickel Oxide	1313-99-1	1.5E+04	USEPA	8.4E+02	USEPA	6.4E+04	USEPA	3.1E+03	DTSC	--	--	2.6E-04	OEHHA	1.1E-02	OEHHA	2.0E-02	OEHHA
Nickel Refinery Dust	Nickel refinery dust	1.6E+04	USEPA	8.2E+02	USEPA	6.9E+04	USEPA	3.1E+03	DTSC	--	RSL	2.4E-04	IRIS	1.1E-02	OEHHA	1.4E-02	OEHHA
Nickel Soluble Salts	7440-02-0	1.5E+04	USEPA	4.9E+02	DTSC	6.4E+04	USEPA	3.1E+03	DTSC	--	--	2.6E-04	OEHHA	1.1E-02	OEHHA	1.4E-02	OEHHA
Nickel Subsulfide	12035-72-2	4.1E-01	USEPA	8.2E+02	USEPA	4.8E-01	DTSC	3.1E+03	DTSC	1.7E+00	OEHHA	4.8E-04	OEHHA	1.1E-02	OEHHA	1.4E-02	OEHHA
Pentachloroethane	76-01-7	1.1E+00	DTSC	--	--	4.6E+00	DTSC	--	--	9.0E-02	PPRTV	2.3E-05	Route	--	--	--	--
Phosphorus, White	7723-14-0	--	--	4.3E-01	DTSC	--	--	2.2E+00	DTSC	--	--	--	--	2.0E-05	IRIS	8.0E-02	Route
Phthalates	Phthalates	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
~Dimethylterephthalate	120-61-6	--	--	7.8E+03	USEPA	--	--	2.9E+04	DTSC	--	--	--	--	1.0E-01	IRIS	4.0E+02	Route
Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	--	--	*1.1E+05*	DTSC	--	--	*4.8E+05*	DTSC	--	--	--	--	--	--	8.0E-02	OEHHA
Silver	7440-22-4	--	--	3.9E+02	USEPA	--	--	1.5E+03	DTSC	--	--	--	--	5.0E-03	IRIS	--	--
Tetrachloroethane, 1,1,1,2-	630-20-6	2.0E+00	USEPA	5.5E+02	DTSC	8.9E+00	USEPA	**2.8E+03**	DTSC	2.6E-02	IRIS	7.4E-06	IRIS	3.0E-02	IRIS	1.2E+02	Route
Tetrachloroethane, 1,1,2,2-	79-34-5	6.1E-01	USEPA	1.6E+03	USEPA	2.7E+00	USEPA	**4.4E+03**	DTSC	2.0E-01	IRIS	5.8E-05	OEHHA	2.0E-02	IRIS	8.0E+01	Route
Tetrachloroethylene	127-18-4	5.9E-01	DTSC	8.2E+01	USEPA	2.7E+00	DTSC	**3.9E+02**	USEPA	5.4E-01	OEHHA PHG	6.1E-06	OEHHA	6.0E-03	IRIS	4.0E+01	IRIS
Toluene	108-88-3	--	--	**1.1E+03**	DTSC	--	--	**5.4E+03**	DTSC	--	--	--	--	8.0E-02	IRIS	3.0E+02	OEHHA
Toluene-2,4-diisocyanate	584-84-9	1.6E+01	DTSC	6.4E+00	USEPA	7.6E+01	DTSC	2.7E+01	USEPA	3.9E-02	OEHHA	1.1E-05	OEHHA	--	--	8.0E-03	OEHHA
Toluene-2,6-diisocyanate	91-08-7	1.6E+01	DTSC	5.3E+00	USEPA	7.5E+01	DTSC	2.2E+01	USEPA	3.9E-02	OEHHA	1.1E-05	OEHHA	--	--	8.0E-03	OEHHA
Toluidine, o-	95-53-4	2.9E+00	DTSC	--	--	8.2E+00	DTSC	--	--	1.8E-01	OEHHA	5.1E-05	OEHHA	--	--	--	--
Tri-n-butyltin	688-73-3	--	--	3.6E+00	DTSC	--	--	1.7E+01	DTSC	--	--	--	--	3.0E-04	PPRTV	1.2E+00	Route
Trichlorobenzene, 1,2,3-	87-61-6	--	--	6.3E+01	USEPA	--	--	3.1E+02	DTSC	--	--	--	--	8.0E-04	sPPRTV	3.2E+00	Route
Trichloroethane, 1,1,1-	71-55-6	--	--	**1.7E+03**	DTSC	--	--	**7.3E+03**	DTSC	--	--	--	--	2.0E+00	IRIS	1.0E+03	OEHHA
Trichlorofluoromethane	75-69-4	--	--	1.2E+03	DTSC	--	--	**5.4E+03**	DTSC	--	--	--	--	3.0E-01	IRIS	1.2E+03	Route
Trichlorophenol, 2,4,6-	88-06-2	7.5E+00	DTSC	6.3E+01	USEPA	2.1E+01	DTSC	8.2E+02	USEPA	7.0E-02	OEHHA	2.0E-05	OEHHA	1.0E-03	PPRTV	--	--
Trichloropropane, 1,1,2-	598-77-6	--	--	3.9E+02	USEPA	--	--	1.1E+03	DTSC	--	--	--	--	5.0E-03	IRIS	2.0E+01	Route
Trichloropropane, 1,2,3-	96-18-4	1.5E-03	DTSC	4.9E+00	USEPA	2.1E-02	DTSC	2.1E+01	USEPA	3.0E+01	IRIS	7.5E-03	Route	4.0E-03	IRIS	3.0E-01	IRIS
Trimethylbenzene, 1,3,5-	108-67-8	--	--	**2.7E+02**	USEPA	--	--	**1.5E+03**	USEPA	--	--	--	--	1.0E-02	IRIS	6.0E+01	IRIS
Trimethylpentene, 2,4,4-	25167-70-8	--	--	**4.0E+01**	DTSC	--	--	**1.7E+02**	DTSC	--	--	--	--	1.0E-02	sPPRTV	4.0E+01	Route
Vanadium and Compounds	7440-62-2	--	--	3.9E+02	USEPA	--	--	1.0E+03	DTSC	--	--	--	--	5.0E-03	USEPA RSL	1.0E-01	ATSDR
Vinyl Chloride	75-01-4	8.8E-03	DTSC	7.0E+01	USEPA	1.5E-01	DTSC	3.8E+02	USEPA	2.7E-01	OEHHA	7.8E-05	OEHHA	3.0E-03	IRIS	1.0E+02	IRIS
Additional Analytes																	
Beryllium Sulfate	13510-49-1	4.4E+00	DTSC	1.5E+01	DTSC	1.9E+01	DTSC	2.1E+02	DTSC	--	--	8.6E-01	OEHHA	2.0E-04	OEHHA PHG	7.0E-03	OEHHA
Dichlorobenzene, 1,3-	541-73-1	--	--	2.4E+02	DTSC	--	--	1.1E+03	DTSC	--	--	--	--	3.0E-02	DTSC J&E	1.2E+02	Route
Methylcyclohexane	108-87-2	--	--	5.5E+03	DTSC	--	--	2.3E+04	DTSC	--	--	--	--	--	--	6.0E+03	Cyclohexane

[a] Summarized from Appendix A, Table A-1. As noted in the text, a DTSC-SL for soil is at least 3-fold more protective than a corresponding USEPA RSL. USEPA RSLs are provided for completeness when there is no DTSC-SL for a combination of receptor and endpoint;
"--" = indicates that toxicity values are not available.

[b] Screening levels for lead are derived differently than other risk-based screening levels; see the text discussion for details.

Bold values indicate a concentration in excess of the soil saturation concentration
Italicized values indicate a concentration in excess of 10% by weight (100,000 mg/kg)

(mg/kg-d)$^{-1}$ = per (milligram per kilogram--day)
($\mu g/m^3$)$^{-1}$ = per (microgram per cubic meter)
$\mu g/m^3$ = micrograms per cubic meter
ATSDR = Agency for Toxic Substances and Disease Registry
CAS# = Chemical Abstracts Service Registry Number
DTSC = California Department of Toxic Substances Control
HEAST = Health Effects Assessment Summary Tables
IRIS = USEPA's *Integrated Risk Information System*
IUR = inhalation unit-risk factor
J&E = Johnson and Etinger model for vapor intrusion
mg/kg = milligrams per kilogram
mg/kg-d = milligrams per kilogram--day
NSRL = no significan risk level
OEHHA = California Office of Environmental Health Hazard Assessment
PEA = DTSC's Preliminary Endangerment Assessment manual
PHG = Public Health Goal toxicity factor
PPRTV = provisional peer-reviewed toxicity value
RfC = reference concentration
REL = reference exposure level
RfDo = oral reference dose
Route = route extrapolation from an oral toxicity value to an inhalation toxicity value
IUR ($\mu g/m^3$)$^{-1}$ = SFo (mg/kg-day)$^{-1}$ × (1/80 kg) × 20 m^3/day × 0.001 mg/µg
RfC ($\mu g/m^3$) = RfDo (mg/kg-day) × 80 kg × (1 day/20 m^3) × 1000 µg/mg
RSL = USEPA Regional Screening Level
SFo = oral slope factor
SL = screening level
sPPRTV = screening-level PPRTV
USEPA = U.S. Environmental Protection Agency

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Table 2. DTSC-Recommended Screening Levels for Tap Water[a]

Analyte	CAS #	Screening Levels for Tap Water (µg/L)				Toxicity Factors for DTSC-SLs							
		Cancer Endpoint		Noncancer Endpoint		Oral Slope Factor		Inhalation Unit Risk		Reference Dose - Oral		Reference Concentration	
		Final Value	Source	Final Value	Source	SFo (mg/kg-d)$^{-1}$	Source	IUR (µg/m^3)$^{-1}$	Source	RfDo (mg/kg-d)	Ref.	RfC or REL (µg/m^3)	Source
USEPA RSL Analytes													
Acetophenone	98-86-2	--	--	5.8E+02	DTSC	--	--	--	--	1.0E-01	IRIS	4.0E+02	Route
Acrylamide	79-06-1	5.6E-03	DTSC	4.0E+01	USEPA	4.5E+00	OEHHA	1.3E-03	OEHHA	2.0E-03	IRIS	6.0E+00	IRIS
Acrylonitrile	107-13-1	1.5E-02	DTSC	4.1E+00	USEPA	1.0E+00	OEHHA	2.9E-04	OEHHA	4.0E-02	ATSDR	2.0E+00	IRIS
Aldrin	309-00-2	9.2E-04	USEPA	1.8E-01	DTSC	1.7E+01	IRIS	4.9E-03	IRIS	3.0E-05	IRIS	1.2E-01	Route
Arsenic, Inorganic	7440-38-2	8.2E-03	DTSC	7.0E-02	DTSC	9.5E+00	OEHHA PHG	3.3E-03	OEHHA	3.5E-06	OEHHA	1.5E-02	OEHHA
Benzaldehyde	100-52-7	4.3E+00	DTSC	5.8E+02	DTSC	4.0E-03	PPRTV	1.0E-06	Route	1.0E-01	IRIS	4.0E+02	Route
Benzene	71-43-2	1.5E-01	DTSC	5.7E+00	DTSC	1.0E-01	OEHHA	2.9E-05	OEHHA	4.0E-03	IRIS	3.0E+00	OEHHA
Benzenethiol	108-98-5	--	--	5.6E+00	DTSC	--	--	--	--	1.0E-03	PPRTV	4.0E+00	Route
Beryllium and compounds	7440-41-7	--	--	4.0E+00	DTSC	--	--	--	--	2.0E-04	OEHHA PHG	7.0E-03	OEHHA
Bis(2-chloro-1-methylethyl) ether	108-60-1	--	--	2.3E+02	DTSC	--	--	--	--	4.0E-02	IRIS	1.6E+02	Route
Bromodichloromethane	75-27-4	1.2E-01	DTSC	1.2E+02	DTSC	1.3E-01	OEHHA	3.7E-05	OEHHA	2.0E-02	IRIS	8.0E+01	Route
Bromoform	75-25-2	2.9E+00	DTSC	1.2E+02	DTSC	1.1E-02	OEHHA	1.1E-06	IRIS	2.0E-02	IRIS	8.0E+01	Route
Butanol, N-	71-36-3	--	--	5.9E+02	DTSC	--	--	--	--	1.0E-01	IRIS	4.0E+02	Route
Butylbenzene, n-	104-51-8	--	--	2.9E+02	DTSC	--	--	--	--	5.0E-02	PPRTV	2.0E+02	Route
Butylbenzene, sec-	135-98-8	--	--	5.9E+02	DTSC	--	--	--	--	1.0E-01	sPPRTV	4.0E+02	Route
Carbon Tetrachloride	56-23-5	1.0E-01	DTSC	3.6E+01	DTSC	1.5E-01	OEHHA	4.2E-05	OEHHA	4.0E-03	IRIS	4.0E+01	OEHHA
Carbonyl Sulfide	463-58-1	--	--	2.1E+01	DTSC	--	--	--	--	--	--	1.0E+01	OEHHA
Chloral Hydrate	302-17-0	--	--	5.9E+02	DTSC	--	--	--	--	1.0E-01	IRIS	4.0E+02	Route
Chlordane	12789-03-6	5.7E-03	DTSC	7.7E-01	USEPA	1.3E+00	OEHHA	3.4E-04	OEHHA	5.0E-04	IRIS	7.0E-01	IRIS
Chloroacetaldehyde, 2-	107-20-0	6.4E-02	DTSC	--	--	2.7E-01	sPPRTV	6.8E-05	Route	--	--	--	--
Chloroethanol, 2-	107-07-3	--	--	1.2E+02	DTSC	--	--	--	--	2.0E-02	PPRTV	8.0E+01	Route
Chlorophenol, 2-	95-57-8	--	--	2.9E+01	DTSC	--	--	--	--	5.0E-03	IRIS	2.0E+01	Route
Crotonaldehyde, trans-	123-73-9	9.1E-03	DTSC	5.9E+00	DTSC	1.9E+00	HEAST	4.8E-04	Route	1.0E-03	PPRTV	4.0E+00	Route
Cyanides	Cyanides	--	--	--	--	--	--	--	--	--	--	--	--
~Cyanogen	460-19-5	--	--	5.9E+00	DTSC	--	--	--	--	1.0E-03	IRIS	4.0E+00	Route
~Cyanogen Bromide	506-68-3	--	--	5.3E+02	DTSC	--	--	--	--	9.0E-02	IRIS	3.6E+02	Route
~Cyanogen Chloride	506-77-4	--	--	2.9E+02	DTSC	--	--	--	--	5.0E-02	IRIS	2.0E+02	Route
~Thiocyanic Acid	463-56-9	--	--	1.2E+00	DTSC	--	--	--	--	2.0E-04	PPRTV	8.0E-01	Route
Cyclohexylamine	108-91-8	--	--	1.2E+03	DTSC	--	--	--	--	2.0E-01	IRIS	8.0E+02	Route
Dibromochloromethane	124-48-1	2.0E-01	DTSC	1.2E+02	DTSC	8.4E-02	IRIS	2.1E-05	Route	2.0E-02	IRIS	8.0E+01	Route
Dibromoethane, 1,2-	106-93-4	7.5E-03	USEPA	1.7E+00	DTSC	2.0E+00	IRIS	6.0E-04	IRIS	9.0E-03	IRIS	8.0E-01	OEHHA
Dichloroethane, 1,1-	75-34-3	2.7E+00	USEPA	1.2E+03	DTSC	5.7E-03	OEHHA	1.6E-06	OEHHA	2.0E-01	PPRTV	8.0E+02	Route
Dichloroethylene, 1,2-cis-	156-59-2	--	--	1.2E+01	DTSC	--	--	--	--	2.0E-03	IRIS	8.0E+00	Route
Dichloroethylene, 1,2-trans-	156-60-5	--	--	1.1E+02	DTSC	--	--	--	--	2.0E-02	IRIS	8.0E+01	Route
Dichloropropane, 1,3-	142-28-9	--	--	1.1E+02	DTSC	--	--	--	--	2.0E-02	PPRTV	8.0E+01	Route
Diethylformamide	617-84-5	--	--	5.9E+00	DTSC	--	--	--	--	1.0E-03	PPRTV	4.0E+00	Route
Diisopropyl Methylphosphonate	1445-75-6	--	--	4.7E+02	DTSC	--	--	--	--	8.0E-02	IRIS	3.2E+02	Route
Dimethylaniline, N,N-	121-69-7	6.2E-01	DTSC	1.1E+01	DTSC	2.7E-02	PPRTV	6.8E-06	Route	2.0E-03	IRIS	8.0E+00	Route
Dithiane, 1,4-	505-29-3	--	--	5.9E+01	DTSC	--	--	--	--	1.0E-02	IRIS	4.0E+01	Route
Endosulfan	115-29-7	--	--	3.3E+01	DTSC	--	--	--	--	6.0E-03	IRIS	2.4E+01	Route
Epichlorohydrin	106-89-8	1.9E-01	DTSC	2.0E+00	USEPA	8.0E-02	OEHHA	2.3E-05	OEHHA	6.0E-03	PPRTV	1.0E+00	IRIS
Ethyl Ether	60-29-7	--	--	1.2E+03	DTSC	--	--	--	--	2.0E-01	IRIS	8.0E+02	Route
Ethylene Diamine	107-15-3	--	--	5.3E+02	DTSC	--	--	--	--	9.0E-02	PPRTV	3.6E+02	Route
Furans	Furans	--	--	--	--	--	--	--	--	--	--	--	--
~Furan	110-00-9	--	--	5.8E+00	DTSC	--	--	--	--	1.0E-03	IRIS	4.0E+00	Route
Guanidine	113-00-8	--	--	5.9E+01	DTSC	--	--	--	--	1.0E-02	sPPRTV	4.0E+01	Route
Hexabromobenzene	87-82-1	--	--	1.2E+01	DTSC	--	--	--	--	2.0E-03	IRIS	8.0E+00	Route
Hexachlorobenzene	118-74-1	8.8E-03	DTSC	4.7E+00	DTSC	1.8E+00	OEHHA	5.1E-04	OEHHA	8.0E-04	IRIS	3.2E+00	Route
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	5.1E-02	USEPA	4.5E+00	USEPA	1.1E+00	OEHHA	3.1E-04	OEHHA	3.0E-04	IRIS	--	--
Isobutyl Alcohol	78-83-1	--	--	1.8E+03	DTSC	--	--	--	--	3.0E-01	IRIS	1.2E+03	Route
Lead Compounds	Lead Compounds	--	--	--	--	--	--	--	--	--	--	--	--
~Lead subacetate	1335-32-6	2.1E+00	DTSC	--	--	3.8E-02	OEHHA	1.1E-05	OEHHA	--	--	--	--
Lewisite	541-25-3	--	--	2.9E-02	DTSC	--	--	--	--	5.0E-06	PPRTV	2.0E-02	Route
Mercury Compounds	Mercury Compounds	--	--	--	--	--	--	--	--	--	--	--	--
~Mercury (elemental)	7439-97-6	--	--	6.3E-02	DTSC	--	--	--	--	--	--	3.0E-02	OEHHA
Merphos	150-50-5	--	--	1.8E-01	DTSC	--	--	--	--	3.0E-05	IRIS	1.2E-01	Route

Table 2. DTSC-Recommended Screening Levels for Tap Water[a]

Analyte	CAS #	Screening Levels for Tap Water (µg/L)				Toxicity Factors for DTSC-SLs							
		Cancer Endpoint		Noncancer Endpoint		Oral Slope Factor		Inhalation Unit Risk		Reference Dose - Oral		Reference Concentration	
		Final Value	Source	Final Value	Source	SFo (mg/kg-d)$^{-1}$	Source	IUR (µg/m^3)$^{-1}$	Source	RfDo (mg/kg-d)	Ref.	RfC or REL (µg/m^3)	Source
Methyl Acetate	79-20-9	--	--	5.9E+03	DTSC	--	--	--	--	1.0E+00	sPPRTV	4.0E+03	Route
Methylene Chloride	75-09-2	9.3E-01	DTSC	1.0E+02	DTSC	1.4E-02	OEHHA	1.0E-06	OEHHA	6.0E-03	IRIS	4.0E+02	OEHHA
Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.0E-02	DTSC	2.6E+01	USEPA	1.5E+00	OEHHA	4.3E-04	OEHHA	2.0E-03	PPRTV	--	--
Mineral oils	8012-95-1	--	--	1.8E+04	DTSC	--	--	--	--	3.0E+00	PPRTV	1.2E+04	Route
Mirex	2385-85-5	8.8E-04	USEPA	1.2E+00	DTSC	1.8E+01	OEHHA	5.1E-03	OEHHA	2.0E-04	IRIS	8.0E-01	Route
Naled	300-76-5	--	--	1.2E+01	DTSC	--	--	--	--	2.0E-03	IRIS	8.0E+00	Route
Nitrotoluene, o-	88-72-2	7.7E-02	DTSC	5.1E+00	DTSC	2.2E-01	PPRTV	5.5E-05	Route	9.0E-04	PPRTV	3.6E+00	Route
Pentabromodiphenyl Ether	32534-81-9	--	--	1.2E+01	DTSC	--	--	--	--	2.0E-03	IRIS	8.0E+00	Route
Pentachloroethane	76-01-7	1.8E-01	DTSC	--	--	9.0E-02	PPRTV	2.3E-05	Route	--	--	--	--
Perfluorobutane Sulfonate	375-73-5	--	--	4.0E+02	USEPA	--	--	--	--	2.0E-02	PPRTV	--	--
Phosphorus, White	7723-14-0	--	--	1.2E-01	DTSC	--	--	--	--	2.0E-05	IRIS	8.0E-02	Route
Phthalates	Phthalates	--	--	--	--	--	--	--	--	--	--	--	--
~Dimethylterephthalate	120-61-6	--	--	5.8E+02	DTSC	--	--	--	--	1.0E-01	IRIS	4.0E+02	Route
Polychlorinated Biphenyls (PCBs)	Polychlorinated Biphenyls	--	--	--	--	--	--	--	--	--	--	--	--
~Aroclor 1016	12674-11-2	2.2E-01	USEPA	4.1E-01	DTSC	7.0E-02	IRIS low-risk	2.0E-05	Route	7.0E-05	IRIS	2.8E-01	Route
~Aroclor 1254	11097-69-1	7.9E-03	USEPA	1.2E-01	DTSC	2.0E+00	IRIS high-risk	5.7E-04	Route	2.0E-05	IRIS	8.0E-02	Route
~Aroclor 5460	11126-42-4	--	--	3.5E+00	DTSC	--	--	--	--	6.0E-04	sPPRTV	2.4E+00	Route
Propargyl Alcohol	107-19-7	--	--	1.2E+01	DTSC	--	--	--	--	2.0E-03	IRIS	8.0E+00	Route
Pyridine	110-86-1	--	--	5.9E+00	DTSC	--	--	--	--	1.0E-03	IRIS	4.0E+00	Route
Tetrachloroethane, 1,1,2,2-	79-34-5	7.6E-02	USEPA	1.1E+02	DTSC	2.0E-01	IRIS	5.8E-05	OEHHA	2.0E-02	IRIS	8.0E+01	Route
Tetrachloroethylene	127-18-4	8.2E-02	DTSC	3.8E+01	DTSC	5.4E-01	OEHHA PHG	6.1E-06	OEHHA	6.0E-03	IRIS	3.5E+01	OEHHA
Toluidine, o-	95-53-4	4.2E-01	DTSC	--	--	1.8E-01	OEHHA	5.1E-05	OEHHA	--	--	--	--
Trichloroethane, 1,1,1-	71-55-6	--	--	2.0E+03	DTSC	--	--	--	--	2.0E+00	IRIS	1.0E+03	OEHHA
Trichlorofluoromethane	75-69-4	--	--	1.7E+03	DTSC	--	--	--	--	3.0E-01	IRIS	1.2E+03	Route
Trichlorophenol, 2,4,6-	88-06-2	6.3E-01	DTSC	1.2E+01	USEPA	7.0E-02	OEHHA	2.0E-05	OEHHA	1.0E-03	PPRTV	--	--
Trichloropropane, 1,1,2-	598-77-6	--	--	2.8E+01	DTSC	--	--	--	--	5.0E-03	IRIS	2.0E+01	Route
Trichloropropane, 1,2,3-	96-18-4	2.0E-04	DTSC	6.2E-01	USEPA	3.0E+01	IRIS	7.5E-03	Route	4.0E-03	IRIS	3.0E-01	IRIS
Additional Analytes													
Beryllium Sulfate	13510-49-1	--	--	4.0E+00	DTSC	--	--	--	--	2.0E-04	OEHHA PHG	7.0E-03	OEHHA
Dichlorobenzene, 1,3-	541-73-1	--	--	1.5E+02	DTSC	--	--	--	--	3.0E-02	DTSC J&E	1.2E+02	Route
Methylcyclohexane	108-87-2	--	--	1.3E+04	DTSC	--	--	--	--	--	--	6.0E+03	Cyclohexane

[a] Summarized from Appendix B, Table B-1. Screening levels in the table are for analytes with a DTSC-SL for at least one endpoint. If available and appropriate, the USEPA RSL is listed for the other endpoint for completeness;
"--" = indicates that, if calculated, the DTSC-modified approach was not at least three-times more stringent than the USEPA Superfund approach OR that no value could be calculated.

(mg/kg-d)$^{-1}$ = per (milligram per kilogram--day)
(µg/m^3)$^{-1}$ = per (microgram per cubic meter)
µg/L = micrograms per liter
µg/m^3 = micrograms per cubic meter
CAS# = Chemical Abstracts Service Registry Number
DTSC = California Department of Toxic Substances Control
HEAST = Health Effects Assessment Summary Tables
IRIS = USEPA's *Integrated Risk Information System*
IUR = inhalation unit-risk factor
J&E = Johnson and Etinger model for vapor intrusion
mg/kg-d = milligrams per kilogram--day
NSRL = no significan risk level
OEHHA = California Office of Environmental Health Hazard Assessment
PHG = Public Health Goal toxicity factor
PPRTV = provisional peer-reviewed toxicity value
RfC = reference concentration
REL = reference exposure level
RfDo = oral reference dose
Route = route extrapolation from an oral toxicity value to an inhalation toxicity value
IUR (µg/m^3)$^{-1}$ = SFo (mg/kg-day)$^{-1}$ × (1/80 kg) × 20 m^3/day × 0.001 mg/µg
RfC (µg/m^3) = RfDo (mg/kg-day) × 80 kg × (1 day/20 m^3) × 1000 µg/mg
SFo = oral slope factor
SL = screening level
sPPRTV = screening-level PPRTV
USEPA = U.S. Environmental Protection Agency

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Table 3. Screening Levels for Ambient Air[a]

Analyte	CAS #	Screening Levels for Residential Air (µg/m³)				Screening Levels for Commercial/Industrial Air (µg/m³)				Toxicity Factor for Final Screening Value			
		Cancer Endpoint		Noncancer Endpoint		Cancer Endpoint		Noncancer Endpoint		Inhalation Unit Risk, IUR (µg/m³)⁻¹		Reference Concentration, RfC or REL (µg/m³)	
		Final Value	Source	Final Value	Source	Final Value	Source	Final Value	Source		Source		Source
USEPA RSL Analytes													
Acetaldehyde	75-07-0	1.0E+00	DTSC	9.4E+00	USEPA	4.5E+00	DTSC	3.9E+01	USEPA	2.7E-06	OEHHA	9.0E+00	IRIS
Acetophenone	98-86-2	--	--	4.2E+02	DTSC	--	--	1.8E+03	DTSC	--	--	4.0E+02	Route
Acrylamide	79-06-1	7.8E-04	DTSC	6.3E+00	USEPA	9.4E-03	DTSC	2.6E+01	USEPA	1.3E-03	OEHHA	6.0E+00	IRIS
Acrylonitrile	107-13-1	9.7E-03	DTSC	2.1E+00	USEPA	4.2E-02	DTSC	8.8E+00	USEPA	2.9E-04	OEHHA	2.0E+00	IRIS
Aldrin	309-00-2	5.7E-04	USEPA	1.3E-01	DTSC	2.5E-03	USEPA	5.3E-01	DTSC	4.9E-03	IRIS	1.2E-01	Route
Ammonia	7664-41-7	--	--	2.1E+02	DTSC	--	--	8.8E+02	DTSC	--	--	2.0E+02	OEHHA
Arsine	7784-42-1	--	--	1.6E-02	DTSC	--	--	6.6E-02	DTSC	--	--	1.5E-02	OEHHA
Benfluralin	1861-40-1	--	--	1.3E+03	DTSC	--	--	5.3E+03	DTSC	--	--	1.2E+03	Route
Benzaldehyde	100-52-7	2.8E+00	DTSC	4.2E+02	DTSC	1.2E+01	DTSC	1.8E+03	DTSC	1.0E-06	Route	4.0E+02	Route
Benzene	71-43-2	9.7E-02	DTSC	3.1E+00	DTSC	4.2E-01	DTSC	1.3E+01	DTSC	2.9E-05	OEHHA	3.0E+00	OEHHA
Benzenethiol	108-98-5	--	--	4.2E+00	DTSC	--	--	1.8E+01	DTSC	--	--	4.0E+00	Route
Benzidine	92-87-5	7.2E-06	DTSC	--	--	8.8E-05	DTSC	--	--	1.4E-01	OEHHA	--	--
Benzotrichloride	98-07-7	8.6E-04	DTSC	--	--	3.8E-03	DTSC	--	--	3.3E-03	Route	--	--
Beryllium and compounds	7440-41-7	1.2E-03	USEPA	7.3E-03	DTSC	5.1E-03	USEPA	3.1E-02	DTSC	2.4E-03	IRIS	7.0E-03	OEHHA
Biphenyl, 1,1'-	92-52-4	1.4E+00	DTSC	4.2E-01	USEPA	6.1E+00	DTSC	1.8E+00	USEPA	2.0E-06	Route	4.0E-01	sPPRTV
Bis(2-chloro-1-methylethyl) ether	108-60-1	--	--	1.7E+02	DTSC	--	--	7.0E+02	DTSC	--	--	1.6E+02	Route
Bis(2-chloroethyl)ether	111-44-4	4.0E-03	DTSC	--	--	1.7E-02	DTSC	--	--	7.1E-04	OEHHA	--	--
Boron Trifluoride	7637-07-2	--	--	7.3E-01	DTSC	--	--	3.1E+00	DTSC	--	--	7.0E-01	HEAST
Bromodichloromethane	75-27-4	7.6E-02	USEPA	8.3E+01	DTSC	3.3E-01	USEPA	3.5E+02	DTSC	3.7E-05	OEHHA	8.0E+01	Route
Bromoform	75-25-2	2.6E+00	USEPA	8.3E+01	DTSC	1.1E+01	USEPA	3.5E+02	DTSC	1.1E-06	IRIS	8.0E+01	Route
Bromophos	2104-96-3	--	--	2.1E+01	DTSC	--	--	8.8E+01	DTSC	--	--	2.0E+01	Route
Bromoxynil Octanoate	1689-99-2	--	--	8.3E+01	DTSC	--	--	3.5E+02	DTSC	--	--	8.0E+01	Route
Butadiene, 1,3-	106-99-0	1.7E-02	DTSC	2.1E+00	USEPA	7.2E-02	DTSC	8.8E+00	USEPA	1.7E-04	OEHHA	2.0E+00	IRIS
Butanol, N-	71-36-3	--	--	4.2E+02	DTSC	--	--	1.8E+03	DTSC	--	--	4.0E+02	Route
Butylate	2008-41-5	--	--	2.1E+02	DTSC	--	--	8.8E+02	DTSC	--	--	2.0E+02	Route
Butylbenzene, n-	104-51-8	--	--	2.1E+02	DTSC	--	--	8.8E+02	DTSC	--	--	2.0E+02	Route
Butylbenzene, sec-	135-98-8	--	--	4.2E+02	DTSC	--	--	1.8E+03	DTSC	--	--	4.0E+02	Route
Butylbenzene, tert-	98-06-6	--	--	4.2E+02	DTSC	--	--	1.8E+03	DTSC	--	--	4.0E+02	Route
Cadmium (Water)	7440-43-9 (water)	6.7E-04	DTSC	1.0E-02	USEPA	2.9E-03	DTSC	4.4E-02	USEPA	4.2E-03	OEHHA	1.0E-02	ATSDR
Carbon Tetrachloride	56-23-5	6.7E-02	DTSC	4.2E+01	DTSC	2.9E-01	DTSC	1.8E+02	DTSC	4.2E-05	OEHHA	4.0E+01	OEHHA
Carbonyl Sulfide	463-58-1	--	--	1.0E+01	DTSC	--	--	4.4E+01	DTSC	--	--	1.0E+01	OEHHA
Chloral Hydrate	302-17-0	--	--	4.2E+02	DTSC	--	--	1.8E+03	DTSC	--	--	4.0E+02	Route
Chlordane	12789-03-6	8.3E-03	DTSC	7.3E-01	USEPA	3.6E-02	DTSC	3.1E+00	USEPA	3.4E-04	OEHHA	7.0E-01	IRIS
Chloroacetaldehyde, 2-	107-20-0	4.2E-02	DTSC	--	--	1.8E-01	DTSC	--	--	6.8E-05	Route	--	--
Chlorobenzilate	510-15-6	3.6E-02	DTSC	--	--	1.6E-01	DTSC	--	--	7.8E-05	HEAST	--	--
Chlorobutane, 1-	109-69-3	--	--	1.7E+02	DTSC	--	--	7.0E+02	DTSC	--	--	1.6E+02	Route
Chloroethanol, 2-	107-07-3	--	--	8.3E+01	DTSC	--	--	3.5E+02	DTSC	--	--	8.0E+01	Route
Chlorophenol, 2-	95-57-8	--	--	2.1E+01	DTSC	--	--	8.8E+01	DTSC	--	--	2.0E+01	Route
Chlorotoluene, o-	95-49-8	--	--	8.3E+01	DTSC	--	--	3.5E+02	DTSC	--	--	8.0E+01	Route
Chlorotoluene, p-	106-43-4	--	--	8.3E+01	DTSC	--	--	3.5E+02	DTSC	--	--	8.0E+01	Route
Chromium(VI)	18540-29-9	6.8E-06	DTSC	1.0E-01	USEPA	8.2E-05	DTSC	4.4E-01	USEPA	1.5E-01	OEHHA	1.0E-01	IRIS
Crotonaldehyde, trans-	123-73-9	5.9E-03	DTSC	4.2E+00	DTSC	2.6E-02	DTSC	1.8E+01	DTSC	4.8E-04	Route	4.0E+00	Route
Cyanides	Cyanides	--	--	--	--	--	--	--	--	--	--	--	--
~Cyanogen	460-19-5	--	--	4.2E+00	DTSC	--	--	1.8E+01	DTSC	--	--	4.0E+00	Route
~Cyanogen Bromide	506-68-3	--	--	3.8E+02	DTSC	--	--	1.6E+03	DTSC	--	--	3.6E+02	Route
~Cyanogen Chloride	506-77-4	--	--	2.1E+02	DTSC	--	--	8.8E+02	DTSC	--	--	2.0E+02	Route
~Thiocyanic Acid	463-56-9	--	--	8.3E-01	DTSC	--	--	3.5E+00	DTSC	--	--	8.0E-01	Route
Cyclohexylamine	108-91-8	--	--	8.3E+02	DTSC	--	--	3.5E+03	DTSC	--	--	8.0E+02	Route
Dibenzothiophene	132-65-0	--	--	4.2E+01	DTSC	--	--	1.8E+02	DTSC	--	--	4.0E+01	Route
Dibromobenzene, 1,3-	108-36-1	--	--	1.7E+00	DTSC	--	--	7.0E+00	DTSC	--	--	1.6E+00	Route
Dibromobenzene, 1,4-	106-37-6	--	--	4.2E+01	DTSC	--	--	1.8E+02	DTSC	--	--	4.0E+01	Route
Dibromochloromethane	124-48-1	1.3E-01	DTSC	8.3E+01	DTSC	5.8E-01	DTSC	3.5E+02	DTSC	2.1E-05	Route	8.0E+01	Route
Dibromoethane, 1,2-	106-93-4	4.7E-03	USEPA	8.3E-01	DTSC	2.0E-02	USEPA	3.5E+00	DTSC	6.0E-04	IRIS	8.0E-01	OEHHA

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Table 3. Screening Levels for Ambient Air[a]

Analyte	CAS #	Screening Levels for Residential Air (µg/m³)				Screening Levels for Commercial/Industrial Air (µg/m³)				Toxicity Factor for Final Screening Value			
		Cancer Endpoint		Noncancer Endpoint		Cancer Endpoint		Noncancer Endpoint		Inhalation Unit Risk, IUR (µg/m³)⁻¹		Reference Concentration, RfC or REL (µg/m³)	
		Final Value	Source	Final Value	Source	Final Value	Source	Final Value	Source		Source		Source
Dichloroethane, 1,1-	75-34-3	1.8E+00	USEPA	8.3E+02	DTSC	7.7E+00	USEPA	3.5E+03	DTSC	1.6E-06	OEHHA	8.0E+02	Route
Dichloroethylene, 1,1-	75-35-4	--	--	7.3E+01	DTSC	--	--	3.1E+02	DTSC	--	--	7.0E+01	OEHHA
Dichloroethylene, 1,2-cis-	156-59-2	--	--	8.3E+00	DTSC	--	--	3.5E+01	DTSC	--	--	8.0E+00	Route
Dichloroethylene, 1,2-trans-	156-60-5	--	--	8.3E+01	DTSC	--	--	3.5E+02	DTSC	--	--	8.0E+01	Route
Dichloropropane, 1,3-	142-28-9	--	--	8.3E+01	DTSC	--	--	3.5E+02	DTSC	--	--	8.0E+01	Route
Dichloropropene, 1,3-	542-75-6	1.8E-01	DTSC	2.1E+01	USEPA	7.7E-01	DTSC	8.8E+01	USEPA	1.6E-05	OEHHA	2.0E+01	IRIS
Dieldrin	60-57-1	6.1E-04	USEPA	2.1E-01	DTSC	2.7E-03	USEPA	8.8E-01	DTSC	4.6E-03	IRIS	2.0E-01	Route
Diethylformamide	617-84-5	--	--	4.2E+00	DTSC	--	--	1.8E+01	DTSC	--	--	4.0E+00	Route
Diisopropyl Methylphosphonate	1445-75-6	--	--	3.3E+02	DTSC	--	--	1.4E+03	DTSC	--	--	3.2E+02	Route
Dimethylaniline, N,N-	121-69-7	4.2E-01	DTSC	8.3E+00	DTSC	1.8E+00	DTSC	3.5E+01	DTSC	6.8E-06	Route	8.0E+00	Route
Dioxane, 1,4-	123-91-1	3.6E-01	DTSC	3.1E+01	USEPA	1.6E+00	DTSC	1.3E+02	USEPA	7.7E-06	OEHHA	3.0E+01	IRIS
Dioxins	Dioxins	--	--	--	--	--	--	--	--	--	--	--	--
~Hexachlorodibenzo-p-dioxin, Mixture	hlorodibenzo-p-dioxin Mixt	7.4E-07	DTSC	--	--	3.2E-06	DTSC	--	--	3.8E+00	OEHHA	--	--
Diphenylhydrazine, 1,2-	122-66-7	1.1E-02	DTSC	--	--	4.9E-02	DTSC	--	--	2.5E-04	OEHHA	--	--
Dithiane, 1,4-	505-29-3	--	--	4.2E+01	DTSC	--	--	1.8E+02	DTSC	--	--	4.0E+01	Route
EPTC	759-94-4	--	--	1.0E+02	DTSC	--	--	4.4E+02	DTSC	--	--	1.0E+02	Route
Endosulfan	115-29-7	--	--	2.5E+01	DTSC	--	--	1.1E+02	DTSC	--	--	2.4E+01	Route
Epichlorohydrin	106-89-8	1.2E-01	DTSC	1.0E+00	USEPA	5.3E-01	DTSC	4.4E+00	USEPA	2.3E-05	OEHHA	1.0E+00	IRIS
Ethoxyethanol, 2-	110-80-5	--	--	7.3E+01	DTSC	--	--	3.1E+02	DTSC	--	--	7.0E+01	OEHHA
Ethyl Ether	60-29-7	--	--	8.3E+02	DTSC	--	--	3.5E+03	DTSC	--	--	8.0E+02	Route
Ethylene Diamine	107-15-3	--	--	3.8E+02	DTSC	--	--	1.6E+03	DTSC	--	--	3.6E+02	Route
Ethylene Glycol Monobutyl Ether	111-76-2	--	--	8.6E+01	DTSC	--	--	3.6E+02	DTSC	--	--	8.2E+01	OEHHA
Formaldehyde	50-00-0	2.2E-01	USEPA	9.4E+00	DTSC	9.4E-01	USEPA	3.9E+01	DTSC	1.3E-05	IRIS	9.0E+00	OEHHA
Furans	Furans	--	--	--	--	--	--	--	--	--	--	--	--
~Dibenzofuran	132-64-9	--	--	4.2E+00	DTSC	--	--	1.8E+01	DTSC	--	--	4.0E+00	Route
~Furan	110-00-9	--	--	4.2E+00	DTSC	--	--	1.8E+01	DTSC	--	--	4.0E+00	Route
Guanidine	113-00-8	--	--	4.2E+01	DTSC	--	--	1.8E+02	DTSC	--	--	4.0E+01	Route
Heptachlor	76-44-8	2.2E-03	USEPA	2.1E+00	DTSC	9.4E-03	USEPA	8.8E+00	DTSC	1.3E-03	IRIS	2.0E+00	Route
Heptachlor Epoxide	1024-57-3	1.1E-03	USEPA	5.4E-02	DTSC	4.7E-03	USEPA	2.3E-01	DTSC	2.6E-03	IRIS	5.2E-02	Route
Hexabromobenzene	87-82-1	--	--	8.3E+00	DTSC	--	--	3.5E+01	DTSC	--	--	8.0E+00	Route
Hexachlorobenzene	118-74-1	5.5E-03	DTSC	3.3E+00	DTSC	2.4E-02	DTSC	1.4E+01	DTSC	5.1E-04	OEHHA	3.2E+00	Route
Hexachlorobutadiene	87-68-3	1.3E-01	USEPA	4.2E+00	DTSC	5.6E-01	USEPA	1.8E+01	DTSC	2.2E-05	IRIS	4.0E+00	Route
Hexachlorocyclohexane, Alpha-	319-84-6	1.6E-03	USEPA	3.3E+01	DTSC	6.8E-03	USEPA	1.4E+02	DTSC	1.8E-03	IRIS	3.2E+01	Route
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	9.1E-03	USEPA	1.3E+00	DTSC	4.0E-02	USEPA	5.3E+00	DTSC	3.1E-04	OEHHA	1.2E+00	Route
Hexachlorocyclohexane, Technical	608-73-1	2.6E-03	DTSC	--	--	1.1E-02	DTSC	--	--	1.1E-03	OEHHA	--	--
Hydrogen Chloride	7647-01-0	--	--	9.4E+00	DTSC	--	--	3.9E+01	DTSC	--	--	9.0E+00	OEHHA
Isobutyl Alcohol	78-83-1	--	--	1.3E+03	DTSC	--	--	5.3E+03	DTSC	--	--	1.2E+03	Route
Isopropalin	33820-53-0	--	--	6.3E+01	DTSC	--	--	2.6E+02	DTSC	--	--	6.0E+01	Route
Lead Compounds	Lead Compounds	--	--	--	--	--	--	--	--	--	--	--	--
~Tetraethyl Lead	78-00-2	--	--	4.2E-04	DTSC	--	--	1.8E-03	DTSC	--	--	4.0E-04	Route
Lewisite	541-25-3	--	--	2.1E-02	DTSC	--	--	8.8E-02	DTSC	--	--	2.0E-02	Route
Mercury Compounds	Mercury Compounds	--	--	--	--	--	--	--	--	--	--	--	--
~Mercuric Chloride (and other Mercury salts)	7487-94-7	--	--	3.1E-02	DTSC	--	--	1.3E-01	DTSC	--	--	3.0E-02	OEHHA
~Mercury (elemental)	7439-97-6	--	--	3.1E-02	DTSC	--	--	1.3E-01	DTSC	--	--	3.0E-02	OEHHA
Merphos	150-50-5	--	--	1.3E-01	DTSC	--	--	5.3E-01	DTSC	--	--	1.2E-01	Route
Methanol	67-56-1	--	--	4.2E+03	DTSC	--	--	1.8E+04	DTSC	--	--	4.0E+03	OEHHA
Methoxychlor	72-43-5	--	--	2.1E+01	DTSC	--	--	8.8E+01	DTSC	--	--	2.0E+01	Route
Methyl Acetate	79-20-9	--	--	4.2E+03	DTSC	--	--	1.8E+04	DTSC	--	--	4.0E+03	Route
Methylene Chloride	75-09-2	1.0E+00	DTSC	4.2E+02	DTSC	1.2E+01	DTSC	1.8E+03	DTSC	1.0E-06	OEHHA	4.0E+02	OEHHA
Methylenediphenyl Diisocyanate	101-68-8	--	--	8.3E-02	DTSC	--	--	3.5E-01	DTSC	--	--	8.0E-02	OEHHA
Methylstyrene, Alpha-	98-83-9	--	--	2.9E+02	DTSC	--	--	1.2E+03	DTSC	--	--	2.8E+02	Route
Mineral oils	8012-95-1	--	--	1.3E+04	DTSC	--	--	5.3E+04	DTSC	--	--	1.2E+04	Route
Mirex	2385-85-5	5.5E-04	USEPA	8.3E-01	DTSC	2.4E-03	USEPA	3.5E+00	DTSC	5.1E-03	OEHHA	8.0E-01	Route
Naled	300-76-5	--	--	8.3E+00	DTSC	--	--	3.5E+01	DTSC	--	--	8.0E+00	Route

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Table 3. Screening Levels for Ambient Air[a]

Analyte	CAS #	Screening Levels for Residential Air (µg/m^3)				Screening Levels for Commercial/Industrial Air (µg/m^3)				Toxicity Factor for Final Screening Value			
		Cancer Endpoint		Noncancer Endpoint		Cancer Endpoint		Noncancer Endpoint		Inhalation Unit Risk, IUR (µg/m^3)$^{-1}$		Reference Concentration, RfC or REL (µg/m^3)	
		Final Value	Source	Final Value	Source	Final Value	Source	Final Value	Source		Source		Source
Naphthylamine, 2-	91-59-8	6.2E-03	DTSC	--	--	2.7E-02	DTSC	--	--	4.5E-04	OEHHA	--	--
Nickel Refinery Dust	Nickel refinery dust	1.1E-02	DTSC	1.5E-02	USEPA	4.7E-02	DTSC	6.1E-02	USEPA	2.6E-04	OEHHA	1.4E-02	OEHHA
Nickel Soluble Salts	7440-02-0	1.1E-02	USEPA	1.5E-02	DTSC	4.7E-02	USEPA	6.1E-02	DTSC	2.6E-04	OEHHA	1.4E-02	OEHHA
Nickel Subsulfide	12035-72-2	5.8E-03	USEPA	1.5E-02	USEPA	2.6E-02	USEPA	6.1E-02	USEPA	4.8E-04	IRIS	1.4E-02	OEHHA
Nitroso-di-N-butylamine, N-	924-16-3	9.1E-04	DTSC	--	--	4.0E-03	DTSC	--	--	3.1E-03	OEHHA	--	--
Nitrotoluene, o-	88-72-2	5.1E-02	DTSC	3.8E+00	DTSC	2.2E-01	DTSC	1.6E+01	DTSC	5.5E-05	Route	3.6E+00	Route
Pebulate	1114-71-2	--	--	2.1E+02	DTSC	--	--	8.8E+02	DTSC	--	--	2.0E+02	Route
Pentabromodiphenyl Ether	32534-81-9	--	--	8.3E+00	DTSC	--	--	3.5E+01	DTSC	--	--	8.0E+00	Route
Pentachlorobenzene	608-93-5	--	--	3.3E+00	DTSC	--	--	1.4E+01	DTSC	--	--	3.2E+00	Route
Pentachloroethane	76-01-7	1.2E-01	DTSC	--	--	5.5E-01	DTSC	--	--	2.3E-05	Route	--	--
Pentachloronitrobenzene	82-68-8	4.3E-02	DTSC	1.3E+01	DTSC	1.9E-01	DTSC	5.3E+01	DTSC	6.5E-05	Route	1.2E+01	Route
Perfluorobutane Sulfonate	375-73-5	--	--	8.3E+01	DTSC	--	--	3.5E+02	DTSC	--	--	8.0E+01	Route
Phosphoric Acid	7664-38-2	--	--	7.3E+00	DTSC	--	--	3.1E+01	DTSC	--	--	7.0E+00	OEHHA
Phosphorus, White	7723-14-0	--	--	8.3E-02	DTSC	--	--	3.5E-01	DTSC	--	--	8.0E-02	Route
Phthalates	Phthalates	--	--	--	--	--	--	--	--	--	--	--	--
~Dimethylterephthalate	120-61-6	--	--	4.2E+02	DTSC	--	--	1.8E+03	DTSC	--	--	4.0E+02	Route
Polychlorinated Biphenyls (PCBs)	Polychlorinated Biphenyls	--	--	--	--	--	--	--	--	--	--	--	--
~Aroclor 1016	12674-11-2	1.4E-01	USEPA	2.9E-01	DTSC	6.1E-01	USEPA	1.2E+00	DTSC	2.0E-05	Route (IRIS lowest risk)	2.8E-01	Route
~Aroclor 1254	11097-69-1	4.9E-03	USEPA	8.3E-02	DTSC	2.1E-02	USEPA	3.5E-01	DTSC	5.7E-04	Route (IRIS high risk)	8.0E-02	Route
~Aroclor 5460	11126-42-4	--	--	2.5E+00	DTSC	--	--	1.1E+01	DTSC	--	--	2.4E+00	Route
Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	--	--	8.3E-02	DTSC	--	--	3.5E-01	DTSC	--	--	8.0E-02	OEHHA
Polynuclear Aromatic Hydrocarbons (PAHs)	PAH	--	--	--	--	--	--	--	--	--	--	--	--
~Acenaphthene	83-32-9	--	--	2.5E+02	DTSC	--	--	1.1E+03	DTSC	--	--	2.4E+02	Route
~Anthracene	120-12-7	--	--	1.3E+03	DTSC	--	--	5.3E+03	DTSC	--	--	1.2E+03	Route
~Chloronaphthalene, Beta-	91-58-7	--	--	3.3E+02	DTSC	--	--	1.4E+03	DTSC	--	--	3.2E+02	Route
~Fluorene	86-73-7	--	--	1.7E+02	DTSC	--	--	7.0E+02	DTSC	--	--	1.6E+02	Route
~Methylnaphthalene, 1-	90-12-0	3.9E-01	DTSC	2.9E+02	DTSC	1.7E+00	DTSC	1.2E+03	DTSC	7.3E-06	Route	2.8E+02	Route
~Methylnaphthalene, 2-	91-57-6	--	--	1.7E+01	DTSC	--	--	7.0E+01	DTSC	--	--	1.6E+01	Route
~Pyrene	129-00-0	--	--	1.3E+02	DTSC	--	--	5.3E+02	DTSC	--	--	1.2E+02	Route
Profluralin	26399-36-0	--	--	2.5E+01	DTSC	--	--	1.1E+02	DTSC	--	--	2.4E+01	Route
Propargyl Alcohol	107-19-7	--	--	8.3E+00	DTSC	--	--	3.5E+01	DTSC	--	--	8.0E+00	Route
Pyridine	110-86-1	--	--	4.2E+00	DTSC	--	--	1.8E+01	DTSC	--	--	4.0E+00	Route
Ronnel	299-84-3	--	--	2.1E+02	DTSC	--	--	8.8E+02	DTSC	--	--	2.0E+02	Route
Styrene	100-42-5	--	--	9.4E+02	DTSC	--	--	3.9E+03	DTSC	--	--	9.0E+02	OEHHA
Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl	140-57-8	3.3E-01	DTSC	--	--	1.4E+00	DTSC	--	--	8.6E-06	OEHHA	--	--
Terbufos	13071-79-9	--	--	1.0E-01	DTSC	--	--	4.4E-01	DTSC	--	--	1.0E-01	Route
Tetrachlorobenzene, 1,2,4,5-	95-94-3	--	--	1.3E+00	DTSC	--	--	5.3E+00	DTSC	--	--	1.2E+00	Route
Tetrachloroethane, 1,1,1,2-	630-20-6	3.8E-01	USEPA	1.3E+02	DTSC	1.7E+00	USEPA	5.3E+02	DTSC	7.4E-06	IRIS	1.2E+02	Route
Tetrachloroethane, 1,1,2,2-	79-34-5	4.8E-02	USEPA	8.3E+01	DTSC	2.1E-01	USEPA	3.5E+02	DTSC	5.8E-05	OEHHA	8.0E+01	Route
Tetrachloroethylene	127-18-4	4.6E-01	DTSC	3.7E+01	DTSC	2.0E+00	DTSC	1.5E+02	DTSC	6.1E-06	OEHHA	3.5E+01	OEHHA
Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	5.6E-04	DTSC	--	--	2.5E-03	DTSC	--	--	5.0E-03	Route	--	--
Toluene	108-88-3	--	--	3.1E+02	DTSC	--	--	1.3E+03	DTSC	--	--	3.0E+02	OEHHA
Toxaphene	8001-35-2	8.3E-03	DTSC	--	--	3.6E-02	DTSC	--	--	3.4E-04	OEHHA	--	--
Tri-n-butyltin	688-73-3	--	--	1.3E+00	DTSC	--	--	5.3E+00	DTSC	--	--	1.2E+00	Route
Triallate	2303-17-5	--	--	5.4E+01	DTSC	--	--	2.3E+02	DTSC	--	--	5.2E+01	Route
Tribromobenzene, 1,2,4-	615-54-3	--	--	2.1E+01	DTSC	--	--	8.8E+01	DTSC	--	--	2.0E+01	Route
Trichlorobenzene, 1,2,3-	87-61-6	--	--	3.3E+00	DTSC	--	--	1.4E+01	DTSC	--	--	3.2E+00	Route
Trichlorobenzene, 1,2,4-	120-82-1	3.9E-01	DTSC	2.1E+00	USEPA	1.7E+00	DTSC	8.8E+00	USEPA	7.3E-06	Route	2.0E+00	PPRTV
Trichloroethane, 1,1,1-	71-55-6	--	--	1.0E+03	DTSC	--	--	4.4E+03	DTSC	--	--	1.0E+03	OEHHA
Trichlorofluoromethane	75-69-4	--	--	1.3E+03	DTSC	--	--	5.3E+03	DTSC	--	--	1.2E+03	Route
Trichlorophenol, 2,4,6-	88-06-2	1.4E-01	DTSC	--	--	6.1E-01	DTSC	--	--	2.0E-05	OEHHA	--	--
Trichloropropane, 1,1,2-	598-77-6	--	--	2.1E+01	DTSC	--	--	8.8E+01	DTSC	--	--	2.0E+01	Route
Trichloropropane, 1,2,3-	96-18-4	1.4E-04	DTSC	3.1E-01	USEPA	1.6E-03	DTSC	1.3E+00	USEPA	7.5E-03	Route	3.0E-01	IRIS
Trifluralin	1582-09-8	1.5E+00	DTSC	3.1E+01	DTSC	6.4E+00	DTSC	1.3E+02	DTSC	1.9E-06	Route	3.0E+01	Route

Table 3. Screening Levels for Ambient Air[a]

Analyte	CAS #	Screening Levels for Residential Air (µg/m^3)				Screening Levels for Commercial/Industrial Air (µg/m^3)				Toxicity Factor for Final Screening Value			
		Cancer Endpoint		Noncancer Endpoint		Cancer Endpoint		Noncancer Endpoint		Inhalation Unit Risk, IUR (µg/m^3)$^{-1}$	Source	Reference Concentration, RfC or REL (µg/m^3)	Source
		Final Value	Source	Final Value	Source	Final Value	Source	Final Value	Source				
Trimethylbenzene, 1,3,5-	108-67-8	--	--	4.2E+01	DTSC	--	--	1.8E+02	DTSC	--	--	4.0E+01	Route
Trimethylpentene, 2,4,4-	25167-70-8	--	--	4.2E+01	DTSC	--	--	1.8E+02	DTSC	--	--	4.0E+01	Route
Vernolate	1929-77-7	--	--	4.2E+00	DTSC	--	--	1.8E+01	DTSC	--	--	4.0E+00	Route
Vinyl Chloride	75-01-4	9.5E-03	DTSC	1.0E+02	USEPA	1.6E-01	DTSC	4.4E+02	USEPA	7.8E-05	OEHHA	1.0E+02	IRIS
Additional Analytes													
Beryllium Sulfate	13510-49-1	3.3E-06	DTSC	7.3E-03	DTSC	1.4E-05	DTSC	3.1E-02	DTSC	8.6E-01	OEHHA	7.0E-03	OEHHA
Dichlorobenzene, 1,3-	541-73-1	--	--	1.3E+02	DTSC	--	--	5.3E+02	DTSC	--	--	1.2E+02	Route
Methylcyclohexane	108-87-2	--	--	6.3E+03	DTSC	--	--	2.6E+04	DTSC	--	--	6.0E+03	Cyclohexane

[a] Summarized from Appendix C, Table C-1. Screening levels in the table are for analytes with a DTSC-SL for at least one combination of receptor and endpoint. USEPA RSLs are listed for other combinations of receptors to provide completeness;
"--" = indicates that no value could be calculated.

(µg/m^3)$^{-1}$ = per (microgram per cubic meter)
µg/m^3 = micrograms per cubic meter
ATSDR = Agency for Toxic Substances and Disease Registry
CAS# = Chemical Abstracts Service Registry Number
DTSC = California Department of Toxic Substances Control
HEAST = Health Effects Assessment Summary Tables
IRIS = USEPA's *Integrated Risk Information System*
IUR = inhalation unit-risk factor
J&E = Johnson and Etinger model for vapor intrusion
PPRTV = provisional peer-reviewed toxicity value
RfC = reference concentration
REL = reference exposure level
Route = route extrapolation from an oral toxicity value to an inhalation toxicity value
IUR (µg/m^3)$^{-1}$ = SFo (mg/kg-day)$^{-1}$ × (1/80 kg) × 20 m^3/day × 0.001 mg/µg
RfC (µg/m^3) = RfDo (mg/kg-day) × 80 kg × (1 day/20 m^3) × 1000 µg/mg
RSL = USEPA Regional Screening Level
SL = screening level
sPPRTV = screening-level PPRTV
USEPA = U.S. Environmental Protection Agency

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Table 4. Screening Levels for Tap Water that Exceed the California Maximum Contaminant Levels

Analyte	CAS #	Screening Levels for Tap Water (µg/L)				Maximum Contaminant Level (MCL) (µg/L)	
		Cancer Endpoint		Noncancer Endpoint			
		Screening Level	Source	Screening Level	Source	California	USEPA
Aluminum	7429-90-5	--	--	20000	USEPA	1000	--
Antimony (metallic)	7440-36-0	--	--	7.8	USEPA	6	6
Barium	7440-39-3	--	--	3800	USEPA	1000	2000
Bentazon	25057-89-0	--	--	570	USEPA	18	--
Cadmium (Water)	7440-43-9 (water)	--	--	9.2	USEPA	5	5
Carbofuran	1563-66-2	--	--	94	USEPA	18	40
Chlorobenzene	108-90-7	--	--	78	USEPA	70	100
Cyanides							
~Sodium Cyanide	143-33-9	--	--	20	USEPA	150	200
Dalapon	75-99-0	--	--	600	USEPA	200	200
Dichloroethylene, 1,1-	75-35-4	--	--	130	DTSC	6	7
Dichloroethylene, 1,2-cis-	156-59-2	--	--	12	DTSC	6	70
Dichloroethylene, 1,2-trans-	156-60-5	--	--	110	DTSC	10	100
Dichlorophenoxy Acetic Acid, 2,4-	94-75-7	--	--	170	USEPA	70	70
Dinoseb	88-85-7	--	--	15	USEPA	7	7
Diquat	85-00-7	--	--	44	USEPA	20	20
Endothall	145-73-3	--	--	380	USEPA	100	100
Endrin	72-20-8	--	--	2.3	USEPA	2	2
Glyphosate	1071-83-6	--	--	2000	USEPA	700	700
Mercury Compounds							
~Mercuric Chloride (and other Mercury salts)	7487-94-7	--	--	3	DTSC	2	2
Methyl tert-Butyl Ether (MTBE)	1634-04-4	14	USEPA	6300	USEPA	13	--
Molinate	2212-67-1	--	--	30	USEPA	20	--
Nickel Soluble Salts	7440-02-0	--	--	220	DTSC	100	--
Nitrite	14797-65-0	--	--	2000	USEPA	1000	1000
Oxamyl	23135-22-0	--	--	500	USEPA	50	200
Perchlorates							
~Perchlorate and Perchlorate Salts	14797-73-0	--	--	7.4	DTSC	6	--
Phthalates							
~Bis(2-ethylhexyl)phthalate	117-81-7	5.6	USEPA	400	USEPA	4	6
Picloram	1918-02-1	--	--	1400	USEPA	500	500
Selenium	7782-49-2	--	--	100	USEPA	50	50
Styrene	100-42-5	--	--	1100	DTSC	100	100
Thiobencarb	28249-77-6	--	--	160	USEPA	70	--
Toluene	108-88-3	--	--	410	DTSC	150	1000
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	--	--	55000	USEPA	1200	--
Trichloroethane, 1,1,1-	71-55-6	--	--	2000	DTSC	200	200
Trichlorofluoromethane	75-69-4	--	--	1700	DTSC	150	--
Trichlorophenoxypropionic acid, -2,4,5	93-72-1	--	--	110	USEPA	50	50