ATSDR Newsletter for Health Assessors

Including APPLETREE Partners

PHA Process & Clearance News

July 2026

Welcome!

The purpose of this newsletter is to keep you informed about the PHA process, clearance, and resources that are available for use in your health evaluations.

What is in this Newsletter?

The following topics are included in this edition of the ATSDR Newsletter for Health Assessors. An index of all topics covered in previous newsletters has been added to the Public Health Assessment Guidance Manual (PHAGM) resource page under the heading of ATSDR Health Assessor Newsletter.

Alternative Screening Levels for Lead in Soil

ATSDR does not have screening levels for lead in soil, but several APPLETREE states have used 80 ppm or 200 ppm as alternative screening levels for lead in soil.

The California Department of Toxic Substances Control (DTSC), part of the California Environmental Protection Agency (CalEPA), recommends using 80 ppm lead in soil as a preliminary remediation goal (PRG) in the screening risk assessment process. The PRG90 (80 ppm) refers to the 90th percentile distribution of blood lead levels in a child or the fetus of a pregnant woman. It represents a change of 1 µg/dL of lead in blood that is associated with a lowering of IQ by one point [DTSC 2020; Lanphear 2005]. Therefore, health assessors may use 80 ppm as an alternative screening level for lead in soil and cite CalEPA [DTSC 2020] in cases where bioavailability is not known to be unusually elevated (i.e., > 30%). For example, soil lead contamination from shooting ranges [Zhang 2025] and gold mine tailings [Kastury 2024] may have gastrointestinal absorption greater than the default value used to develop the screening level (30% absorption fraction, i.e., relative bioavailability 60%). Therefore, a lower screening level should be considered when the absorption fraction is higher than the default.

Another alternative screening level is the U.S. Environmental Protection Agency (EPA)'s regional screening level (RSL) of 200 ppm for residential soil. EPA proposed this RSL in a directive dated October 16, 2025, in a memo titled "Residential Lead Directive for CERCLA Sites and RCRA Hazardous Waste Cleanup Program Facilities." EPA uses RSLs to identify and define areas that may need further evaluation, although further evaluation may be warranted below the screening level in some specific situations. EPA states that RSLs are not default PRGs or cleanup levels and can be adjusted to account for relevant site-specific considerations, such as technical limitations, bioavailability, and soil lead background levels [EPA 2025].

These soil screening levels are also supported by EPA's Integrated Exposure Uptake Biokinetic (IEUBK) modeling. A 5% probability of blood lead levels of 3.5 µg/dL (CDC's blood lead reference value) and 5 µg/dL are estimated from exposure to soil concentrations of 92 ppm and 207 ppm, respectively, which are close to 80 ppm and 200 ppm (Table 1).

When evaluating soil lead, health assessors should be aware of and possibly report soil background levels for lead. Mean and median geogenic background levels from the top five centimeters are available from the USGS survey of soils from the contiguous United States (Smith 2013). The median level in the United States is 18.1 ppm, with a median absolute deviation of 7.4 ppm. Assuming a normal distribution, the upper distribution of soil lead levels is approximately 32 ppm (90th percentile), 36 ppm (95th percentile), and 44 ppm (99th percentile). Soil lead statistics are also available by state with and without outliers (Soil Lead by State).

And, finally, this U.S. map shows the distribution of soil lead nationwide. Some documents will occasionally report soil levels as "urban background levels." The higher soil lead levels found in urban environments are likely from anthropogenic sources, like leaded gasoline, and are not naturally occurring. Health assessors should avoid using this phrase in their documents as justification that the levels are not a health concern.

Table 1. Soil lead concentrations with an estimated 5% chance of blood lead levels for children ages 12 to 72 months (1 to 7 years), with all other parameters set to default values. Assumes exposure occurs for more than 90 days.

Soil lead concentration (mg/kg)	IEUBK modeling shows a 5% chance that a child exposed to the corresponding soil lead will have a blood lead level in the range below* (µg/dL)
>2,791	>30
1,589 to ≤2,791	20 to <30
618 to ≤1,589	10 to <20
207 to ≤618	5 to <10
92 to ≤207	3.5 to <5
≤92	<3.5

*The blood lead level ranges are based on CDC medical management guidelines [CDC 2025]. The modeling used default IEUBK settings other than each soil concentration and the air background concentration of 0.04 µg/m^3 based on EPA monitoring of national air quality trends [EPA 2026]. The EPA model is not validated for blood lead levels <5 µg/dL and >30 µg/dL and may be less accurate in these ranges.

Health assessors may use either 80 ppm or 200 ppm as alternative screening levels for identifying soil lead levels that require further evaluation. Identifying multiple sources of lead in a community could be justification for selecting 80 ppm as a screening level. Health assessors can use an EPA lead model, such as the IEUBK model for preschool children or the All Ages Lead Model, to further evaluate the risk of lead exposure in a community. Health assessors should always acknowledge that no safe level of lead in blood has been identified and that, when possible, exposure should be minimized.

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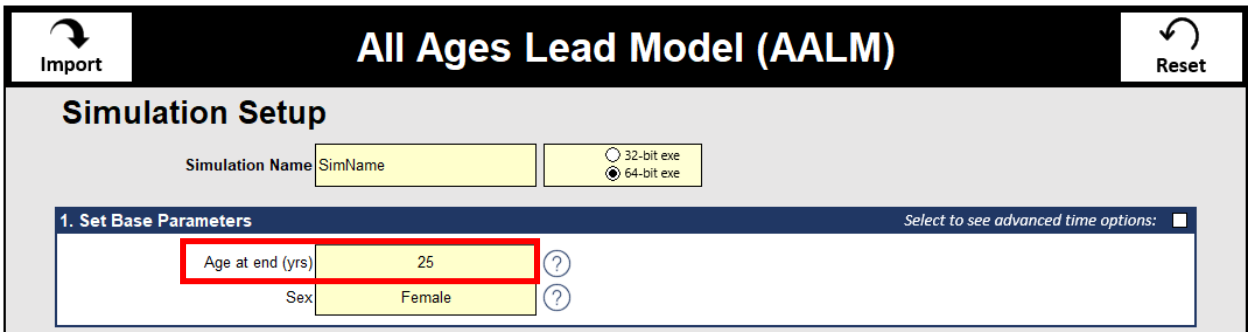
Setting Base Parameters within the EPA All Ages Lead Model (AALM)

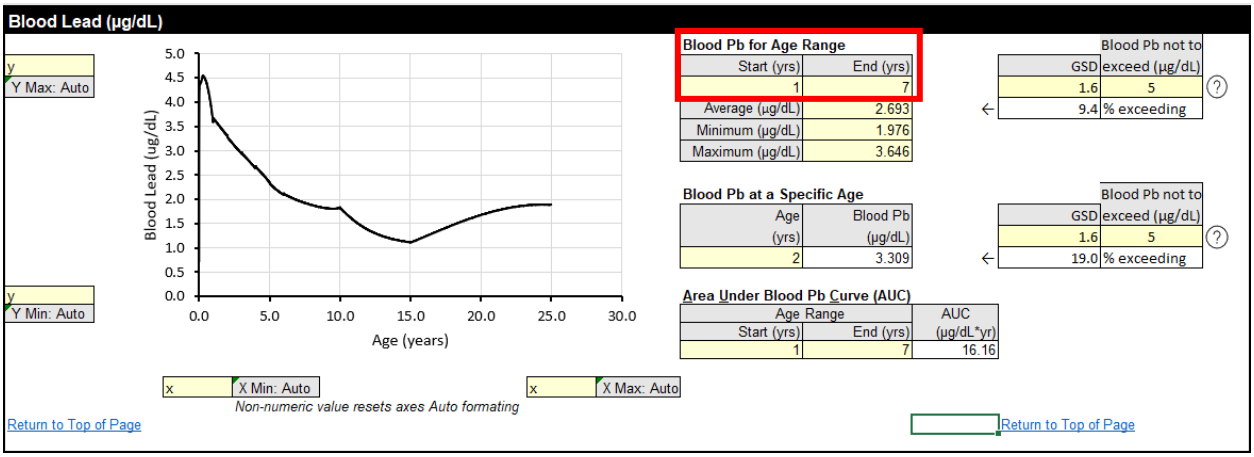
EPA released the AALM (version 3) in April 2024 to allow health assessors to simulate blood lead levels for individuals from birth to age 90 years. When running the AALM, health assessors should be careful with one of the first steps that often gets overlooked: setting the "Age at end (yrs)" within the base parameters on the "Simulation Setup" page. When the "Age at end (yrs)" is set to less than 25 years, the simulation does not run correctly due to errors affecting rate constants. The "Age at end (yrs)" must be set to at least age 25 years for the simulation to run accurately (Figure 1).

Figure 1. All Ages Lead Model must set "Age at end (yrs)" to at least 25



If you need to assess impacts of lead on populations younger than age 25 years, you can modify age parameters after you run the simulation. This includes changing the "Start (yrs)" and "End (yrs)" for the age ranges you are most concerned about. For example, if you are most concerned about the blood lead level for a target population of children ages 1–7 years, the "Start (yrs)" and "End (yrs)" may be changed to view only that specific age range (Figure 2), but the "Age at end (yrs)" must be set at 25.

Figure 2. "Start (yrs)" and "End (yrs)" age ranges may be changed to less than 25



This issue has been reported and discussed with the EPA, which is working to resolve the issue. This is an interim workaround until the model can be updated.

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Screening Polychlorinated Biphenyl (PCB) Data

Polychlorinated biphenyls (PCBs) are a class of chemicals composed of 209 individual congeners. When PCBs are a concern at a site, the data may contain observations for Total PCBs, Aroclor mixtures, dioxin-like PCBs (PCBs that have dioxin-like toxicity and a toxic equivalent factor [TEF]), and other individual PCB congeners. This article will walk through how to process and screen these types of data.

This article will not cover how to fully evaluate dioxin data; dioxins are a related but separate class of chemicals from PCBs. We will only describe how dioxin-like PCBs need to be evaluated. The full list of dioxin-like PCBs and their TEFs can be found in ATSDR's Dioxin Guidance [ATSDR 2025]. We highly recommend that you read the dioxin guidance before proceeding with PCB data processing and evaluation. Steps for processing and screening PCB data are as follows:

Step 1: Process Co-eluted PCB data

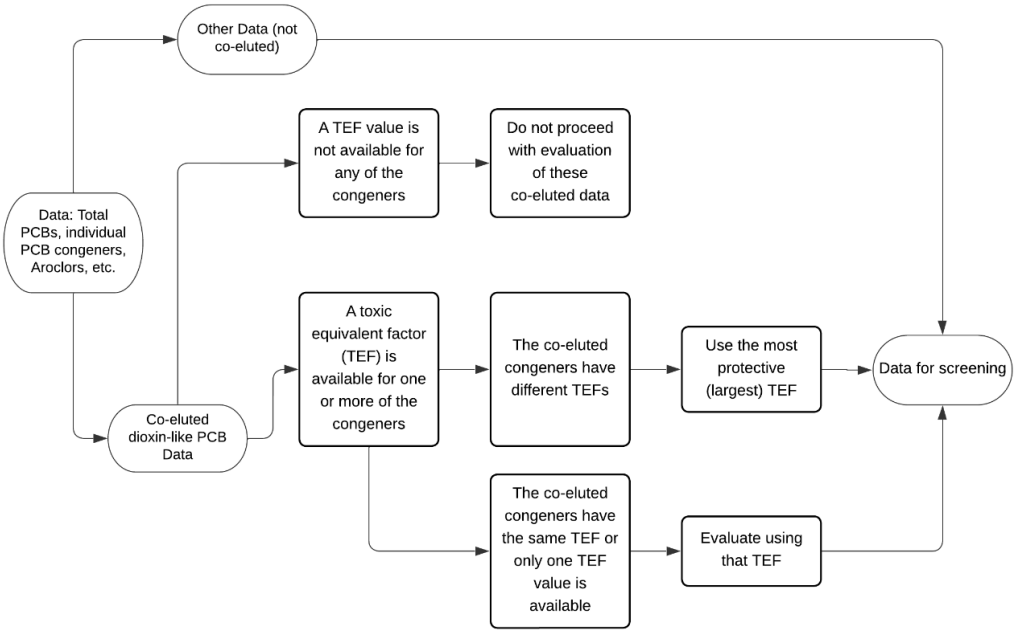
Some lab data will contain what is called "co-eluted" PCBs (e.g. PCB-118/106). This means that the lab could not accurately separate and quantify those compounds individually when performing the chromatography run. In the example above, it means the result is a summation of PCB-118 and PCB-106, and there could be any ratio of the two congeners comprising that result value. Co-eluted PCB data are not a concern for the evaluation of Total PCBs (because Total PCBs are a summation of all PCB congeners). However, if any of the co-eluted congeners are one of the dioxin-like PCBs, this processing step becomes important because individual congener amounts, not their sum, factor into the dioxin toxic equivalent (TEQ) calculation [ATSDR 2025].

These are the steps for processing co-eluted data, as described in the flow chart below (Figure 3):

- Identify and subset the co-eluted observations in your data. Set aside your other data for now.
- Look at each congener of the co-eluted observations.
    - If a TEF value is not available for any of the congeners (i.e., no dioxin-like PCB congeners in data), proceed to Step 2. None of the co-eluted congener data will factor into the dioxin TEQ calculation, and the screening for Total PCBs will be sufficient.
    - If some of the congeners are dioxin-like, meaning there are TEF values available for some or all the co-eluted congeners,
        - and the co-eluted congeners have different TEFs (multiple dioxin-like congeners co-eluted), then use the largest (most protective) TEF value for that observation.
        - and the co-eluted congeners have the same TEF or only one TEF is available (only one congener is dioxin-like), use that TEF for that observation.
- After processing all co-eluted observations, add back the co-eluted data to your other data and continue to data screening.

To walk through this process with our example (PCB-118/106): PCB-118 (CASRN 31508-00-6) is a dioxin-like PCB with a TEF of 0.00003. PCB-106 (CASRN 70424-69-0) is not a dioxin-like PCB and so does not have a TEF. PCB-118/106 will then be assigned a TEF of 0.00003 for the purpose of calculating the maximum dioxin TEQ for this sample, which is the most protective approach.

Figure 3. Flow chart of data processing steps for co-eluted PCB congener data. The steps of the flow chart are described in Step 1: Process co-eluted PCB data. If a TEF value is not available for any of the dioxin-like congeners, proceed to Step 2.



Step 2: Screening

Total PCBs: The data received from the lab will likely contain results for Total PCBs. If not, sum the results for all congeners from a single sample to get Total PCBs. Once you have the Total PCBs for each sample, screen the Total PCBs against the recommended CV, the cancer risk evaluation guide (CREG), for polychlorinated biphenyls (CASRN 1336-36-3) in PHAST. Individual PCB congeners are not evaluated for cancer risk because the toxicological studies are based on mixtures not individual PCB congeners [ATSDR 2000].

Aroclors: Aroclors are sets of PCB congeners that are common in environmental data because of their commercial use [ATSDR 2024].

- Screen Aroclors 1248, 1254, 1260, and 1262 data against the PHAST recommended CV for Aroclor 1254 [NOAA 2008]. This is the chronic environmental media evaluation guide (EMEG) child/reference dose media evaluation guide (RMEG) child.
- Screen Aroclors 1016, 1221, 1232, and 1242 data against the recommended CV for Aroclor 1016 [NOAA 2008] – RMEG child.
- Check if multiple Aroclors were identified in a single sample. This is uncommon, but if this occurs in the data, sum the Aroclor observations for each sample to get a Total PCB concentration for that sample. Proceed with screening for Total PCBs as described above. See the October 2024 ATSDR Newsletter for Health Assessors for more information on Aroclor summation [ATSDR 2024].

Dioxin-like PCBs: If the data contain dioxin-like PCBs, use the dioxin guidance [ATSDR 2025] to calculate a TEQ value. Don't forget to check if the data contain other dioxin compounds; those will need to be included in the dioxin TEQ calculation. Screen the dioxin TEQ against the recommended 2,3,7,8-TCDD TEQ CV [ATSDR 2025] from PHAST.

For these types of chemicals described above, Table 2 lists possible contaminants found in data, along with their corresponding screening contaminant and ATSDR recommended CV type. The health assessor will need to look up the actual comparison values in PHAST for the most up-to-date values.

Table 2. Identifying which ATSDR contaminant CVs to use for screening by comparison to the maximum contaminant result in the data and ATSDR CV Type

Contaminant Data	Screening Contaminant	ATSDR Recommended CV Type
Total PCBs	Polychlorinated biphenyls	CREG
Aroclors 1016, 1221, 1232, 1242	Aroclor 1016	RMEG Child
Aroclors 1248, 1254, 1260, 1262	Aroclor 1254	Chronic EMEG Child/RMEG Child
2,3,7,8-TCDD TEQ (calculated from dioxin-like PCBs)	2,3,7,8-TCDD TEQ	CREG

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Update Your Public Health Documents with These New Health Guidelines

The PHAST team added several minimal risk levels (MRLs), reference concentrations (RfCs), and cancer slope factors (CSFs) to PHAST in late 2025 and early 2026. They include

- benzo(a)pyrene (BaP)
- hexavalent chromium
- chlordane (cis, trans)
- cresol (ortho, meta, para)
- 1,3-dichloropropene (cis, trans)
- perfluorooctanoic acid (PFOA)
- perfluorooctanesulfonic acid (PFOS)
- xylene (ortho, meta, para)

If you are currently working on a public health document with these chemicals, review your screening process to update environmental media evaluation guides (EMEGs), reference concentration media evaluation guides (RMEGs), and cancer risk evaluation guides (CREGs) according to the changes shown in Table 3. You should also update your health evaluations, in particular hazard quotients (HQs) and cancer risk estimates. The PHAST team has added contaminant notes and screening flags for many of the chemicals in Table 3. More information about evaluating PFAS is available from the PHAST resource section, in a document titled "PFAS Technical Evaluation Process."

Some contaminants had health guidelines listed under other names. For example, the health guidelines for chlordane are listed under technical chlordane. The PHAST team added the health guidelines for technical chlordane to cis- and trans-chlordane. A similar situation exists for 1,3-dichloropropene and its cis and trans isomers.

Table 3. Summary of cancer and noncancer health guidelines and cancer toxicity values that changed in PHAST from August 2025 to May 2026

Chemical	PHAST Data Field	Old Value	New Value	Date
BaP Equivalent LB	CSF	None	1.7 $(mkd)^{-1}$	3/26/2026
BaP Equivalent UB	CSF	None	1.7 $(mkd)^{-1}$	3/26/2026
BaP Equivalent LB	IUR	None	0.0011 $(\mu g/m^3)^{-1}$	3/26/2026
BaP Equivalent UB	IUR	None	0.0011 $(\mu g/m^3)^{-1}$	3/26/2026
Chlordane, trans and cis	IUR	None	0.0001 $(\mu g/m^3)^{-1}$	5/4/2026
Chlordane, trans and cis	RfC	None	0.7 $(\mu g/m^3)^{-1}$	5/4/2026
Chlordane, trans and cis	MRL Inhalation Chronic	None	0.02 $(\mu g/m^3)^{-1}$	5/4/2026
Chlordane, trans and cis	MRL Inhalation Intermediate	None	0.2 $(\mu g/m^3)^{-1}$	5/4/2026
Chlordane, trans and cis	CSF	None	0.35 $(mkd)^{-1}$	5/4/2026
Chlordane, trans and cis	RfD	None	0.0005 mkd	5/4/2026
Chlordane, trans and cis	MRL Oral Acute	None	0.001 mkd	5/4/2026
Chlordane, trans and cis	MRL Oral Intermediate	None	0.0006 mkd	5/4/2026
Chlordane, trans and cis	MRL Oral Chronic	None	0.0006 mkd	5/4/2026
Chromium, hexavalent	MRL Inhalation Chronic	None	0.005 $\mu g/m^3$	12/4/2025
Chromium, hexavalent	MRL Inhalation Chronic	None	0.0024 ppb	12/4/2025

Chemical	PHAST Data Field	Old Value	New Value	Date
Cresol, ortho, meta, para	MRL Oral Chronic	None	0.1 mkd	3/27/2026
Cresol, ortho, meta, para	MRL Oral Intermediate	None	0.1 mkd	3/27/2026
1,3-dichloropropene, trans, cis	IUR	None	4E-6 $(\mu g/m^3)^{-1}$	5/4/2026
1,3-dichloropropene, trans, cis	RfC	None	4.4 ppb	5/4/2026
1,3-dichloropropene, trans, cis	MRL Inhalation Intermediate	None	8 ppb	5/4/2026
1,3-dichloropropene, trans, cis	MRL Inhalation Chronic	None	7 ppb	5/4/2026
1,3-dichloropropene, trans, cis	CSF	None	0.1 $(mkd)^{-1}$	5/4/2026
1,3-dichloropropene, trans, cis	RfD	None	0.03 mkd	5/4/2026
1,3-dichloropropene, trans, cis	MRL Oral Intermediate	None	0.04 mkd	5/4/2026
1,3-dichloropropene, trans, cis	MRL Oral Chronic	None	0.03 mkd	5/4/2026
Perfluorooctanoic acid (PFOA)	CSF	None	29,300 $(mkd)^{-1}$	8/27/2025
Perfluorooctanesulfonic acid (PFOS)	CSF	None	39.5 $(mkd)^{-1}$	8/27/2025
Xylene, meta, ortho, para	RfC	None	100 $(\mu g/m^3)$	2/6/2026
Xylene, para	MRL Inhalation Acute	None	2,000 ppb	2/4/2026
Xylene, total, meta, ortho, para	MRL Inhalation Intermediate	600 ppb	400 ppb	5/12/2026
Xylene, total, meta, ortho, para	MRL Inhalation Chronic	50 ppb	10 ppb	5/12/2026
Xylene, total, meta, ortho, para	MRL Oral Intermediate	0.4 mkd	0.2 mkd	5/12/2026

Abbreviations: BaP = benzo(a)pyrene; ppb = parts per billion; mkd = mg/kg/day; $\mu g/m^3$ = micrograms per cubic meter; MRL = minimal risk level; CSF = cancer slope factor; IUR = inhalation unit risk; RfC = reference concentration; LB = lower bound; UB = upper bound

Checking for Health Guideline Updates

The PHAST team will email health assessors when there are important changes to PHAST that might affect your evaluation, such as new MRLs, RfDs, RfCs, CSFs, and inhalation unit risks (IURs). Another way to check for changes in health guidelines and cancer toxicity values is to click "Contaminant Updates" on the PHAST homepage. This opens an Excel file that shows recent changes to the PHAST database, including changes to health guidelines, cancer toxicity values, and comparison values. The file shows the old and new values and provides information about other changes to PHAST. ATSDR health assessors, APPLETREE partners, and others involved with the PHA process can gain access to PHAST by contacting phast@cdc.gov.

It's easy to identify newly released MRLs by periodically checking ATSDR's toxicological profiles website. You can receive email updates about MRLs and tox profiles by providing your email address to our tox profile group. Look for "Subscribe to our newsletter" on the bottom of the toxicological profile website.

If health guidelines or cancer toxicity values change while your document is being developed or while it's in clearance, you will need to update your document with the new value. If you have questions, talk to your associate director of science (ADS) office or technical project officer (TPO).

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Understanding Discrepancies in Hazard Quotients (HQs) from PHAST's Air Calculator

PHAST's air exposure calculator allows health assessors to calculate inhalation HQs, which are equal to the adjusted exposure point concentration (EPC) divided by the relevant health guideline. This is true even when EPCs from air sampling data are entered in different units than the health guideline used to calculate the HQ. PHAST automatically converts either the EPC or the health guideline to calculate HQs when they are in different units. While PHAST uses precise values for conversions and HQ calculations, the air exposure calculator in PHAST reports rounded values. Health assessors should be aware that there can be differences between HQs calculated using rounded, converted air concentrations and those that use the more precise calculations in PHAST. Health assessors should report the HQs from PHAST and avoid using rounded converted doses and concentrations from PHAST to verify HQs.

Hydrogen sulfide example

For example, a health assessor enters an EPC of 8.5 ppb hydrogen sulfide into the air exposure calculator for PHAST. If they use default residential reasonable maximum exposure assumptions, PHAST will report a chronic HQ of 5.9. At the top of the output table in PHAST, the health assessor can choose to display results as ppb or µg/m^3. The top of the table will also display the health guideline used to calculate HQs (in this case EPA's RfC) in the unit the health assessor chooses. Figure 4 is a screenshot of part of the chronic exposure table for this scenario from the air exposure calculator result screen, with ppb selected as the display unit. PHAST reports the original concentration entered (8.5 ppb) as the chronic adjusted EPC and reports EPA's RfC as 1.4 ppb. However, 8.5 ppb divided by 1.4 ppb is equivalent to a rounded HQ of 6.1, so how is PHAST calculating an HQ of 5.9?

Figure 4. Chronic exposure scenario air results from PHAST for hydrogen sulfide using a default residential scenario and ppb as display unit

Chronic Exposure

Exposure Group	Default Residential Scenario	
	Chronic Adjusted EPC ^	Chronic Hazard Quotient
Hydrogen sulfide (EPC: 8.5 ppb; Chronic RfC: 1.4 ppb; IUR: NA[3])		
	ppb	
Birth to < 1 year	8.5	5.9 †
1 to < 2 years	8.5	5.9 †
2 to < 6 years	8.5	5.9 †
6 to < 11 years	8.5	5.9 †
11 to < 16 years	8.5	5.9 †
16 to < 21 years	8.5	5.9 †
Total exposure duration for child cancer risk		
Adult	8.5	5.9 †

The answer lies in a behind-the-scenes unit conversion. PHAST reports the results of converted health guidelines and air EPCs rounded to two significant digits but uses precise values to calculate HQs. EPA derived an RfC of 2 µg/m^3 for hydrogen sulfide. To calculate the HQ based on an EPC reported in ppb, PHAST converts the RfC using this equation:

$$(2\ \mu g/m^3 \times 24.45\ m^3/mol)/34.08\ g/mol \approx 1.43486\ ppb$$

where 24.45 is the molar volume of an ideal gas at 25°C and 1 atm, and 34.08 is the molecular weight of hydrogen sulfide. Calculating the HQ using a more precise value for the converted RfC replicates what we see in PHAST:

$$8.5\ ppb/1.43486\ ppb \approx 5.9$$

The potential for mismatch between rounded, converted air concentrations and an HQ calculated using precise values can occur anytime a molecular weight conversion is needed to compare the entered units with the health guideline. By choosing the display unit, the health assessor chooses whether PHAST reports a converted, rounded value for the EPC or for the health guideline when they are in different units.

EPC and HQ table example

Table 4 provides an example of how a table in a document might report rounded, converted concentrations with HQs calculated using precise values. Footnotes are added to explain that the RfC is converted and precise values are used to calculate the HQ.

Table 4. EPCs and HQs for exposure to hydrogen sulfide in air

Location	EPC (ppb)	EPA RfC (ppb)*	HQ†
Exposure Unit 1	14.8	1.4	10
Exposure Unit 2	10.1	1.4	7.0
Exposure Unit 3	8.5	1.4	5.9
Exposure Unit 4	4.9	1.4	3.4

Abbreviations: EPC = exposure point concentration; EPA = Environmental Protection Agency; RfC = reference concentration; HQ = hazard quotient ; ppb = parts per billion

*EPA's RfC is 2 micrograms per cubic meter. The RfC is converted to ppb and rounded in this table to allow comparison to the sample results in ppb.

† HQs were calculated using the precise value of the RfC after converting to ppb, not the rounded RfC reported in the table.

Units, conversions, and molecular weights in PHAST

If you are not sure if a health guideline in a PHAST output is in the original or converted units, check the original source (usually either EPA's IRIS assessment or ATSDR's Tox Profile). All health guidelines are entered into PHAST in the original units reported by the source. If you would like a slightly more precise conversion, you can use the Air Unit Converter in PHAST, which will report converted values to three significant digits. There can be slight variations in reported molecular weights for some chemicals between different sources,

which can mean that other air unit conversion calculators may estimate slightly different conversions than PHAST. If you would like to know the molecular weight PHAST is using to convert between units for a given chemical, look up the chemical in the CVs and health guidelines module and view the "Contaminant Info" tab.

If you have questions about output from the air exposure calculator or how PHAST handles unit conversions, email PHAST@cdc.gov.

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508 Tips and Tricks: Table Captions, Headers and Data Cells

ATSDR documents that are posted online need to be 508-compliant. This newsletter features a series of articles about common issues in making your public health documents 508-compliant. In this edition of 508 Tips and Tricks, we're discussing how to properly format a table in Word using built-in features and tools; specifically, table captions, headers, and data cells.

Here we have our example (Table 5):

Table 5. Soil Samples

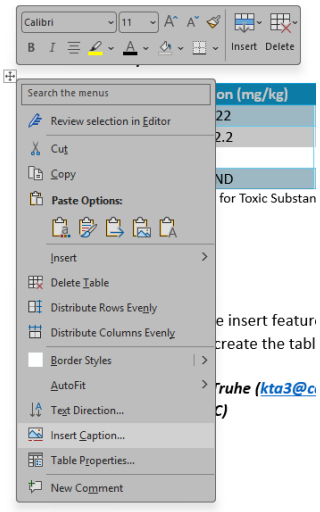
Contaminant	Concentration (mg/kg)	Screening Level (Type)	Exceeded Screening Level
Arsenic	22*	3.1 (ATSDR RMEG)	Yes
Chromium, hexavalent	2.2*	0.69 (ATSDR CREG)	Yes
Thallium	ND	None**	NA

Abbreviations: mg/kg = milligrams; ASTDR = Agency for Toxic Substances and Disease Registry; RMEG = reference dose media evaluation guide; CREG= cancer risk evaluation guide; ND = not detected; NA = not applicable
*Indicates exceeded screening level
**No screening level available

Table Captions

Once you create a table, you can use the Table Caption feature to create the table title. Put your cursor over the table and right-click on the Table Move handle (the small crosshair icon) that appears on the top left. You will then select Insert Caption in the dropdown (Figure 5).

Figure 5. Insert Caption Feature



The caption box will appear and automatically include the word “Table” and a table number; type the title of the table in the caption box and select OK (Figure 6). The generated title in the text will be italicized, and not in the same typeface/font size as the rest of your document. You will need to change the typeface/font size (e.g., Calibri, 12 pt) and unitalicize the title to match the rest of your document.

Figure 6. Insert Caption Box

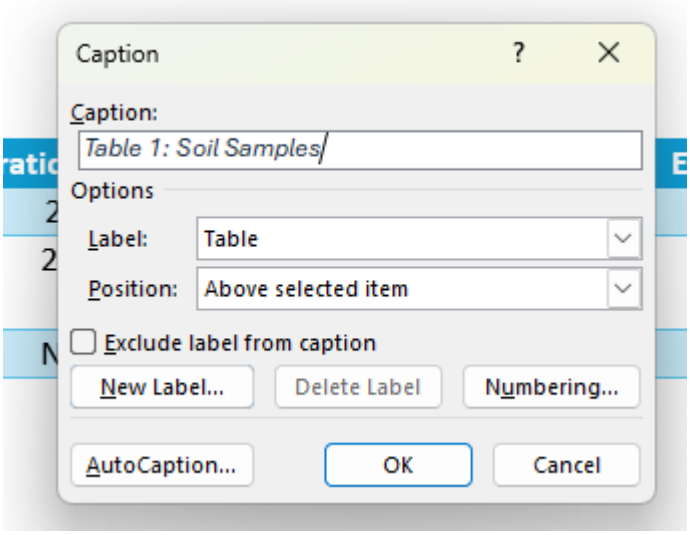
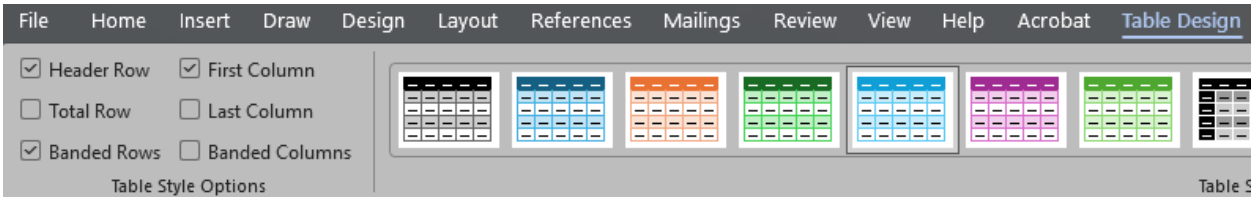


Table Headers and Data Cells

Then, select the table and click on the Table Design tab on the top ribbon.

Figure 7. Table Design Tab



Make sure that the Header Row and First Column boxes are checked (Figure 7). This will make the top row and the first column of your table into headers (Figure 8.) This must be done for each table. The remainder of the cells in the table will be data cells. This action is very important when converting a Word document to PDF for 508 compliance. The first row of a table must have proper headers because screen readers rely on this structure to read, navigate, and provide context for information in the data cells. Without headers, screen readers simply read cells in order, making it impossible to understand the relationship between information in the data cells and column headers.

Figure 8. First Row and First Column Highlighted Gray

Contaminant	Concentration (mg/kg)	Screening Level/Type	Exceeded Screening Level
Arsenic	22	3.1 (ATSDR RMEG)	Yes
Chromium, hexavalent	2.2	0.69 (ATSDR CREG)	Yes
Thallium	ND	None	NA

mg/kg=milligrams; ASTDR=Agency for Toxic Substances and Disease Registry

The first row of your table will always be a header, but there might be times when the first column should be a data cell rather than a header. This is usually for simple tables in which the table headers are considered individual columns. In this case, you will not select First Column (see Figure 7). Below is an example of a table in which the first column is a data cell and the table headers are individual columns (Table 6).

Table 6. Number of Samples by Media

Soil	Groundwater	Air	Biota
23	74	15	17

Table Footnotes

To complete your tables, you will want to ensure that each footnote appears as a separate line, as shown in the example below. Note that abbreviations do not follow this rule (Table 7.)

Table 7. Example of Footnotes Usage in Tables

Contaminant	Concentration (mg/kg)	Screening Level (Type)	Exceeded Screening Level
Arsenic	22*	3.1 (ATSDR RMEG)	Yes
Chromium, hexavalent	2.2*	0.69 (ATSDR CREG)	Yes
Thallium	ND	None**	NA

Abbreviations: mg/kg = milligrams; ASTDR = Agency for Toxic Substances and Disease Registry; RMEG = reference dose media evaluation guide; CREG = cancer risk evaluation guide; ND = not detected; NA = not applicable

*Indicates exceeded screening level

**No screening level available

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"Found a map online?" Avoiding common pitfalls when using existing maps

Health assessments often require maps on short timelines, and it may seem convenient to use existing maps from reports or presentations. While this can save time, many preexisting maps may be only partially relevant to your site, your audience, or the message you are trying to communicate. When maps are reused without thorough review or adjustment, they can confuse readers or raise questions during clearance review.

This article will cover some common issues to watch for when considering an existing map. We will look at a few examples of existing maps and discuss how existing maps can still be useful as a starting point for a request to the Geospatial Research, Analysis and Services Program (GRASP).

Common Issues

1. **Only some of the map content is relevant**
   Maps developed earlier in the site's history may reflect conditions or priorities that have since changed. As a result, some features may be outdated, missing, or misaligned with the health assessment narrative. Examples may include unrelated boundaries, labels, infrastructure, or environmental layers that don't directly support the scenario you are describing. Figure 10 illustrates this issue.

2. **The map looks blurry, distorted, or unreadable in the report**
   A map that looks fine in PowerPoint or on a website can become blurry or distorted once it's inserted into a Word document or exported to PDF. Fonts may shrink, labels may become too large or small, important symbols can blur, and the image may become fuzzy or distorted. Figure 11 demonstrates the image resolution issue.

3. **The map is technically correct, but visually confusing**
   Even when the map contains accurate and relevant data, it may still be difficult to interpret. Poor visual hierarchy, unclear labeling and symbology, or missing titles and supporting text can make it harder for readers to understand key messages. Existing maps are often designed to answer a slightly different question or emphasize a different takeaway. Figure 12 provides an example.

Checklist

Before including an existing map in your report, consider the following:

- ✓ **Relevance**
  - What question does the map answer?
  - Does the map clearly support the question or message in this section?
  - Are all major features on the map there for a reason?
- ✓ **Readability**
  - Are labels and symbols legible without zooming in?
  - Does the map remain clear when printed or viewed as a PDF?
- ✓ **Trust and clarity**
  - Does the map include an appropriate title, date, and data sources?
  - Is geographic context provided (e.g. site boundary, nearby roads, scale bar and/or reference map)?

508 Considerations

When reusing or developing maps, consider 508 compliance. All readers might not be able to understand maps that rely solely on color to convey information, contain low contrast or small text, or lack descriptive captions. Whenever possible, maps should use color-blind-friendly palettes, maintain sufficient contrast, and be accompanied by text that describes key information to support Section 508 requirements.

Map Examples

Figure 9 includes some useful site information but was originally developed for an earlier phase of the investigation. At the time of the health assessment, important features, such as residential sampling locations and updated well identifiers, were missing from this existing map. The map also lacks contextual elements, including a site boundary, nearby road names, and a scale bar, making it harder for readers to orient themselves. The map also lost clarity through copying and pasting, but the primary limitation is missing and outdated content.

Figure 10 is a map with poor resolution. It shows how image quality can degrade when a map is reproduced from an older report or scanned document. Blurred text and symbols reduce readability and may raise questions during clearance review, even when the underlying data are accurate.

Figure 11 accurately depicts public water supply wells within four miles of the site and includes multiple buffers and wellhead protection zones. However, the volume of information and overlapping visual elements make it difficult to quickly identify the key message.

Figure 9. Map showing irrelevant information

Figure 10. Map with poor resolution

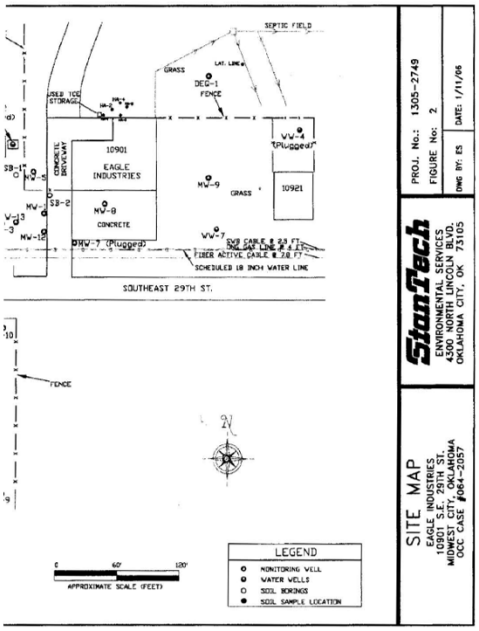
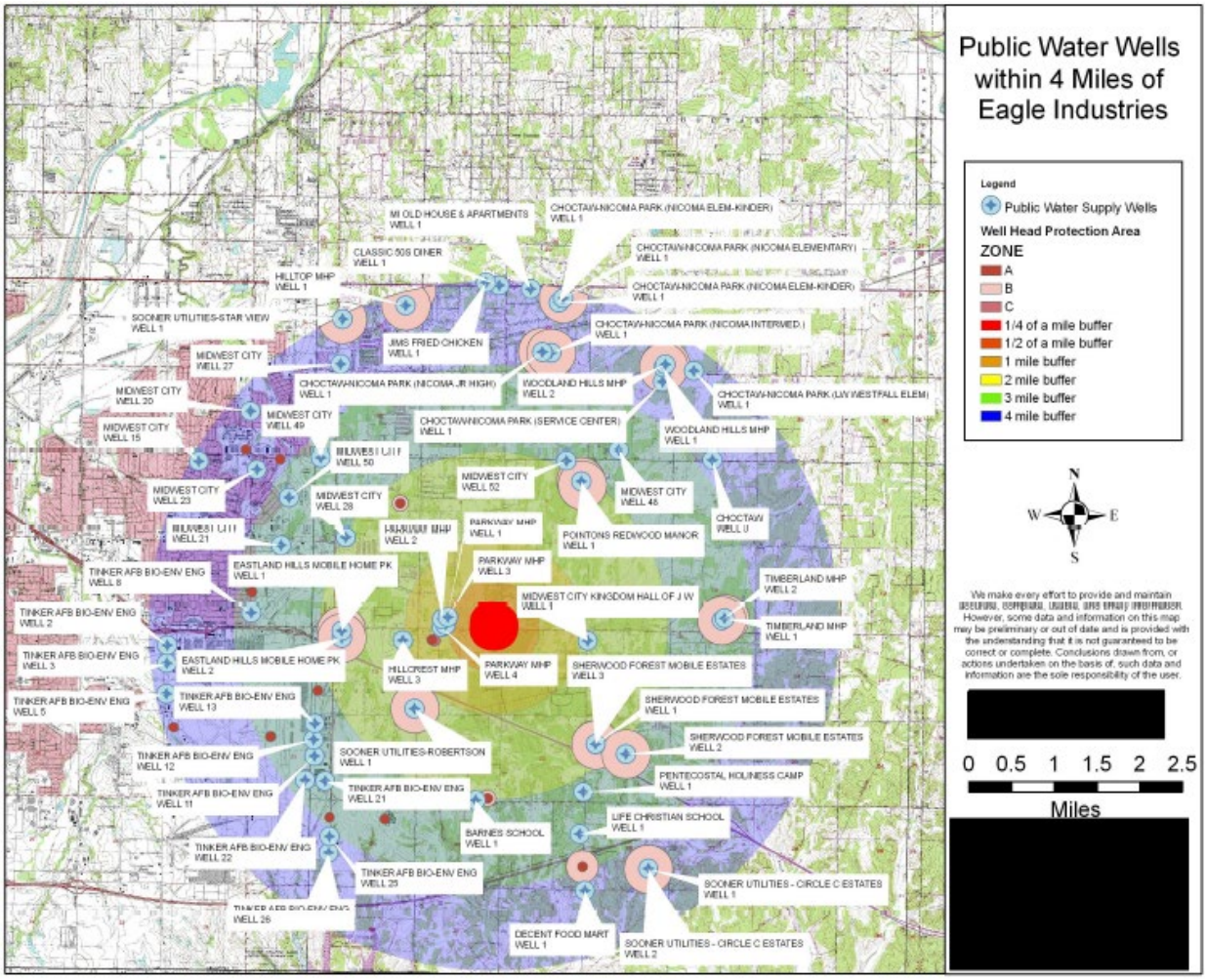


Figure 11. Map with confusing information



How GRASP can help

GRASP can support the mapping needs of ATSDR staff and APPLETREE partners by

- Helping you assess whether existing maps are appropriate to reuse
- Redesigning existing maps to keep the elements that work well while addressing gaps or limitations
- Developing new maps tailored to health assessment needs

In addition to providing introductory maps frequently used in site documents, GRASP can develop custom maps to support site activities and the health assessment process. ATSDR staff may contact GRASP directly through the GRASP Service Request Form. APPLETREE staff can make a request through their Technical Project Officer (TPO).

Source of Figures

Figure 9. Residential well locations. Source: Booz Allen Hamilton, *Trip Report for Soil Borings and Monitoring Wells Installation and Sampling at the Eagle Industries Site, Midwest City, Oklahoma*, prepared for U.S. Environmental Protection Agency Region 6, February 9, 2011 (p. 26).

Figure 10**.** Eagle's Monitoring Well and Soil Sampling Locations. Source: Oklahoma Department of Environmental Quality, *Site Investigation of Eagle Industries Located Near Southeast Twenty-Ninth Street and South Westminster Road, Oklahoma County, Oklahoma*, May 31, 2011.

Figure 11**.** Public Water Wells within 4 Miles of Eagle Industries. Source: Oklahoma Department of Environmental Quality, *Site Investigation of Eagle Industries Located Near Southeast Twenty-Ninth Street and South Westminster Road, Oklahoma County, Oklahoma*, May 31, 2011.

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