AOC SSTL Report Worksheet
Standard Operating Procedure (SOP)

Georgia Risk-based Corrective Action (GRBCA) -
Applicable Threshold Level Determination at Petroleum Sites

Area of Contamination (AOC) SSTL Worksheet Overview

This worksheet evaluates the AOC petroleum release site to determine the applicable GW Site-Specific Threshold Levels (SSTLs), which are based on the groundwater to indoor air vapor intrusion (VI) pathway for the onsite structure. This evaluation is the first of six (6) exposure pathways evaluated that will determine the applicable GW Alternate Concentration Limits (ACLs) for the release. If the remaining five (5) receptor pathways are not present or not at risk of exposure, then the AOC GW SSTL's determined in this worksheet will be the default GW ACLs the workbook publishes.

The vadose and capillary fringe soil class determinations are critical for this worksheet. Users should focus on boring logs near the release source area. The data entered into the AOC Site Specific Threshold Level (SSTL) Report determines the SSTLs for all AOC groundwater COCs. The calculations to determine the groundwater SSTLs are derived in part using the groundwater to indoor air vapor intrusion (VI) algorithms and are based in part on the ASTM 1739-95 (Reapproved 2015) Standard. Once site-specific criteria are selected or entered, the SSTLs can be calculated and the values will be compared to the current COC concentrations previously entered in the RBTL worksheet. *NOTE: Appendix B of the GRBCA Reference Library Document provides a detailed explanation of the algorithms used in the risk evaluation process.*

1. AOC Soil Parameters:

Table 1A: Area of Contamination (AOC) Predominant Soil Class Parameters

Soil classification and their related properties determine the range averaged literature values applied to the exposure pathways including groundwater to indoor air VI algorithms.

NOTE: Appendix F provides a comprehensive evaluation of the Soil Classes used within the GRBCA process and full review of how soil properties were evaluated and applied.

1. **Soil Classes Logged**
   i. Report if boring logs or both boring logs and grain size analysis was completed.
   ii. Report the predominant soil types.
      a. In this selection box, click the appropriate checkboxes for subsurface materials encountered during site investigation activities.
      b. If no overburden exists at the site, select the "Bedrock" [**BR**] checkbox.

2. **Vadose Zone** - applies the applicable range averaged default literature values for bulk density, fractional organic carbon, volumetric air and water content in the vadose zone. The vadose zone soil type also determines hydraulic conductivity and effective porosity values used in the AOPC SSTL Report.

i. Click the checkbox that best describes the **predominant** subsurface material type within each interval as determined during the subsurface investigation.
   a. Accurate boring logs, soil characterized in accordance with the Unified Soil Classification System (USCS) for the investigation, provide meaningful documentation to determine the predominant soil type(s).
   b. Soil types are most accurately determined from laboratory grain size analyses for two (2) soil samples collected per boring from up to three (3) to four (4) soil borings assembled from the most contaminated soil vadose zones.

ii. The average of the vadose sample analyses will determine the average grain size distribution for the vadose soil.

iii. The grain size analyses will analytically determine the predominant soil component of SAND, SILT or CLAY for the vadose zones and are the preferred method of soil type determination.

iv. Lithology Description
   a. Soil boring logs at sites that have a reasonably consistent lithology, the predominant subsurface material type is defined as the material type that has the greatest percentage in the specified interval and is not based on any modifiers that may have been used to describe the material.

      Example: if the vadose zone material consists of 40% sandy SILT and 60% silty CLAY, the predominant vadose zone material type is CLAY. Since the RAR soil type selection process is not based on any modifiers, the "CLAY" checkbox would be selected for the vadose zone material type.

   b. Using soil boring logs, the location of the contaminant source area is also to be factored into soil type selection.

      Example: if the predominant soil type in the source area where the petroleum release occurred is SILT and other uncontaminated vadose soil types more remote to the release point are SAND and/or CLAY, the more accurate soil type selection is "SILT." From a hydrogeological perspective, it may be intuitive to assume that sand formations at a UST release site provide the greatest hydraulic mobility for petroleum COCs and, therefore, should always be selected if present in a typical, lithological heterogeneous UST site; however, that same sand formation typically provides the greatest opportunity for natural attenuation.

3. **Capillary Fringe Zone**- applies the applicable default capillary fringe thickness (**h_{cap}**) in the SSTL calculations.

i. Click the checkbox that best describes the **predominant** subsurface material type within each interval as determined during the subsurface investigation.
   a. Accurate boring logs determine the predominant soil type(s).
   b. Soil types are most accurately determined from laboratory grain size analyses for two (2) soil samples collected per boring from up to three (3) to four (4) soil borings assembled from the most contaminated soil capillary fringe zones.

ii. The average of the capillary fringe sample analyses will determine the average grain size distribution for the capillary fringe samples.

iii. The grain size analyses will analytically determine the **predominant** soil component of SAND, SILT or CLAY for the capillary fringe zones and are the preferred method of soil type determination.

iv. Lithology Description
   a. If the capillary fringe is located at the boundary between two major material types, select the soil type that will result in more conservative risk calculations (most conservative to conservative order is bedrock, sand, clay, silt).

      Example: if the capillary fringe is at the soil/bedrock interface, select the "BR" checkbox. For the purpose of these calculations, the selection of "BR" includes gravel and fractured chert.

v. Table 8 gives guidance on capillary fringe thicknesses used within the workbook:

Table 8: GRBCA Range Averaged, Capillary Fringe Literature Values

RAR Workbook Capillary Fringe Thickness (h_{cap}) by Soil Class						
Soil Class:		SILT	CLAY	SAND	Bedrock	Default
h_{cap}	(cm)	107.94	79.04	24.88	5	5
h_{cap}	**(feet)**	**3.54**	**2.59**	**0.82**	**0.2**	**0.2**

4. Data Source for Soil Classes

Data Source Checkbox- Selecting this **red** and **black** checkbox will auto-populate all AOC worksheet data source references using the report from the RBTL worksheet.

i. If the check box is selected and references are populated, entries may be updated until the worksheet is finalized.

ii. If the checkbox is **not** selected, enter the report date and report name of each data source reference in 4b and 4c (below).

4a. ***Date***- Select the date of the data source reference report where the boring logs and GW analytical results were reviewed.

4b. ***Report Name***- Select a report name from the dropdown menu.

5. Boring Log ID(s)

i. Enter the boring log identifications reviewed to determine the predominant soil type selected.

ii. The predominant soil type is ideally determined within the petroleum release source area.

2. AOC Depth to Groundwater (GW) and FP Parameters:

Table 2A: Most Recent GW Elevation at Release Point

1. Most Recent Depth to GW & Free Product (FP)

Enter the requested parameter information for depth to groundwater ($\mathbf{L_{gw}}$) and, if applicable, depth to free product ($\mathbf{L_{fp}}$).

1a. ***Depth to GW***- For $\mathbf{L_{gw}}$, enter the depth to groundwater from the most current sampling event for the MW displayed. The depth to groundwater is entered in feet from the top of casing (installed at ground level).

i. If benzene is not present, enter the depth of groundwater based on the following order of maximum concentration: MTBE, toluene, total xylenes, ethyl benzene and naphthalene.

1b. ***Depth to FP***- Repeat the same steps for $\mathbf{L_{fp}}$ by entering the depth to free product if the MW ID # is populated by the workbook. The depth to free product is entered in feet from the top of casing (installed at ground level).

2. Date of Reading- Select the date of the data source reference report where results were reviewed.

Table 2B: Site Historic GW & FP Maximum Elevation Change

1. **Site Historic Minimum GW and FP Elevation Change**
   Determine the deepest and shallowest GW elevation occurrence using the entire data set from the most current GW Elevation Table. Enter the maximum (deepest) and minimum (shallowest) recorded GW and FP elevations.

1a. ***GW Depth Range***- Use the entire dataset from the most recent report.
   i. Exclude from consideration (1) tank pit observation wells and (2) deep MWs and (3) offsite MWs, when offsite structures are not evaluated in the risk evaluation.

1b. ***FP Depth Range***- If FP has not been present for two (2) or more years, then enter "N/A" in all Table 2B FP entries.
   i. The deepest elevation and shallowest elevation is compared to the GW VI screening depth, which is determined by the workbook. The VI Screening depth will be identified to be above. within, or below the GW elevation maximum fluctuation range. If GW occurrence is:
      1. Above the GW elevation fluctuation zone, ACLs will be actionable for cleanup
      2. Within the GW elevation fluctuation zone, ACLs may be actionable for cleanup
      3. Below the GW fluctuation elevation zone, ACLs will not be actionable for cleanup

Table 2C: Data Source for Depth to GW and FP Data Parameters

Data Source for Depth to GW and FP Data Parameters

1. **Date-** Select the date of the data source reference report where the results were reviewed.

2. **Report Name-** Select a report name from the dropdown menu

3. **Table ID-** Manual entry for the data source reference table

4. **Table Name-** Manual entry for the name of the data source reference

After entering data and completing checkbox selections in the sections above, the user will see a red **STOP** sign.

a. Review all entries for accuracy.
b. Select the **activated** (green with white text) **Green** command button. Selection will be "1. Calculate AOC SSTLs & Compare COC Concentrations"

3. Comparison of Groundwater COCs to SSTLs:

Table 3: Nonresidence Evaluated Receptor

i. "**Below SSTLs Y/N**" column displays the results of the comparison between the applicable groundwater AOC SSTL and Maximum Groundwater COC Concentrations.

   a. "**Yes**" indicates that the COC concentration is lower than the applicable SSTL.
   b. "**NO**" indicates that the COC concentration is at or above the applicable SSTL and these cells will be highlighted a coral color.

ii. The AOC SSTLs from this table and any applicable AOPC SSTLs are compared in the Site Summary Report to determine the applicable groundwater Alternate Concentration Levels (ACLs).