USTMP Staff GRBCA Training Manual: Step 4

I. Area of Potential Contamination (AOPC) SSTL Report Worksheet Overview:

AOPC Receptors: AOPC or "offsite" is defined by being outside the area of contamination (AOC) and within 500-feet of the release point. Receptors in the AOPC may exist in any direction from the highest GW benzene concentration MW, (MW^{Cmax}) located within the AOC. The Receptor Field Survey results are critical to this step. Of the six (6) receptors types evaluated in the GRBCA workbook process, five (5) of the six (6) receptors are evaluated in the AOPC SSTL worksheet. All five (5) receptor types may be present. Distance from (MW^{Cmax}) is a factor in the calculations. Within each receptor type, multiple receptors may be present, but only one of each receptor type present will be used for evaluation.

GW Secondary Source Evaluation of AOPC Receptors: A near receptor MW (MW^{NR}) is identified and included in the receptor evaluation. The selected (MW^{NR}) is considered a secondary source for evaluated receptors. The purpose of this secondary source evaluation results from an expanding GW contaminant plume toward a receptor caused by (1) variability in GW migration rates transporting contaminants, where contaminant transport exceeds attenuation and/or (2) the impact of a very large or ongoing release resulting in high advection. Both possibilities may result in increased risk of exposure to a nearby receptor. The user will identify (MW^{NR}) by targeting a GW benzene MW with approximately half the concentration (if present) and located between (MW^{Cmax}) and the receptor.

Determination of GW Alternate Concentration Limits (ACLs): This worksheet calculates the GW impact from (MW^{Cmax}) to each AOPC receptor. If the calculated impact exceeds a receptor's applicable MCLs, ISWQs or RBTLs, then the workbook back-calculates the AOC (MW^{Cmax}) SSTLs that are protective of the receptor. If more than one offsite receptor fails this comparison then the workbook will compare each failing receptor and select the lowest, back calculated, AOC (MW^{Cmax}) SSTLs, which is the AOPC Receptor Most at Risk. These SSTLs will then be included in Table 1 Site Summary Report worksheet and will be compared with the AOC Report SSTLs. The lowest SSTLs determined from this comparison will be the GW ACLs for the release. The workbook accomplishes this by completing the three (3) tasks below:

AOPC Task	Task Description	What is Evaluated?	AOPC Line Item	User Action Green Button*
1	Using (MW^{Cmax}) GW values, the workbook calculates the SSTLs for each AOPC receptor evaluated	Site-specific criteria to calculate AOPC receptor SSTLs	1 *(Tables 1A-1F)*	N/A
2	Using the most recent (MW^{NR}) GW elevation for offsite structure receptors, the VI calculations are completed. (MW^{NR}) COC values will be used to evaluate each direct exposure receptor.		2	N/A
3	A. Workbook compares max COC values to calculated SSTLs B. Workbook back-calculates AOC (MW^{Cmax}) values protective of each at-risk receptor.	Max GW COC values will be above or below SSTLs. The lowest back calculated SSTLs are from the receptor most at-risk	3	4. Calculate AOPC SSTLs and Compare COC Concentrations

*Green command buttons may require double clicking

II.   AOC SSTL GW SSTL Determination:

1.   Domenico Equation Parameters

Table 1A- Domenico Source Area Soil and GW Parameters

A   Hydraulic Gradient: A measure of the change in the GW head over a given distance, usually displayed as ft/ft. For a petroleum release site, it will be calculated from a GW elevation gauging event with consideration for distance between the MWs providing the data.

B   Impermeable Barrier Covering Vadose Soil Source Area Only (75 - 95%): Using the Soil Quality plan view map, determine the vadose soil impact area and then record the percent impermeable barrier covering this impact area. If there is no impermeable barrier, enter 75, for 75%. If no vadose soil benzene is present enter 95 for 95%.

C   GW Source Width Perpendicular to GW Flow Direction (feet): The shape of an established GW contaminant plume can reveal GW conditions at a site. For example, a GW plume with no specific direction resembles a pancake on a plan view. GW Quality map would indicate radial flow due to surface water recharge around the UST/former UST system or very low GW flow conditions. Enter the minimum width depicted, which is the length that is perpendicular to the flow direction (maximum plume width). A GW plume with one direction much longer in length than the opposing direction is likely caused by GW flow and or soil structure. Enter the maximum width measured perpendicular to the greatest plume length direction.

D   Vadose Soil Source Width Parallel to GW Flow Direction (feet): Exclude capillary fringe or smear zone soil analysis from consideration. Using only vadose soil results from the release source area, enter the maximum width of impact depicted or that can be entered from the Soil

Quality map. If soil data is older than four (4) years or detections are below applicable regulatory limits, then enter "5" feet for a minimum value.

Table 1B- AOC GW Release Source (MW^{Cmax}) ID#:

No data entry is necessary. The well ID will be pre-populated by the workbook.

Table 1C- Domenico Distances from GW Contamination Source Areas to Receptors

For white shaded data entry cells that are not already populated, enter data according to the instructions below:

1 Applicable Receptor Types: This column names five (5) of the six (6) total receptors the workbook evaluates to determine the applicable ACLs.

2 Distance from (MW^{Cmax}) located in the AOC to the evaluated receptors: Using the Receptor Map or distance provided by the consultant and verified, enter the applicable distances in this column for each white shaded data entry cell in the table.

3a Distance from (MW^{NR}) located between (MW^{Cmax}) and each receptor: Using the Receptor Map or distance provided by the consultant and verified, enter the applicable distances in this column for the white shaded cells.

3b Enter the MW ID # for each (MW^{NR}): Using the GW Quality Map, enter the receptor specific MW ID # located between (MW^{Cmax}) and the applicable receptor.

4 Select the MW-ID# from the drop-down menu: If the MWID # is not listed in the drop-down menu, then follow the blue text instruction in the screenshot below to generate the MW-ID #. If the referenced instructions fail to enter the MW-ID # in the drop-down menu, enter the ID # manually. The corresponding analytical results for the manually entered MW ID # will be

necessary in **Table 2- Groundwater Analytical Results from Nearest Receptor MW** for the specific receptor listed.

Table 1D- Domenico Depth to GW Parameter

Gray cells with an "X" are deactivated and no data entry is necessary. For white shaded data entry cells, enter data per the screenshot instructions below:

Table 1E & 1F- Data Source for Table 1C and 1D- Enter the data source reference to support Table 1C and 1D selections. If the same report is used for data sourcing that was used in the RBTL Report risk evaluation, select the **red** and **black** checkbox (Populate Data Entry Cells) in Table 1- Domenico Source Area Soil and GW Parameters to populate all data source entries.

2. Table 2- Groundwater Analytical Results from Nearest Receptor MW

A Table 2 entries are aligned with the MW-selection in Table 1C- Domenico Distance Parameters, Column 4, above. These tables should already be complete.

- If there are white shaded data entry cells that contain no analytical data, review Table 1C and confirm the MW selection for the receptor listed.
- If the MW ID# is populated in both Table 1C, column 4 and in Table 2 for the same receptor, but there are no analytical results displayed in Table 2, then enter the most recent sample date and analytical results.
- If the MW ID# in Table 2 is blank or contains and "x", then proceed with completing MW data entry in Table 2. Confirm in Table 1C, Column 4 that the MW ID# entered in Table 2 is now displayed.

B Once Table 2 is completed, select [4. Calculate AOPC SSTLs & Compare COC Concentrations] to finalize the worksheet. A Message box will appear.

Results are shown below:

Review tables for completeness. Select the green command button to determine applicable SSTLs.

3. Comparison of calculated AOPC GW SSTLs to RBTLs at each applicable AOPC receptor:

MW^{Cmax} is:	MW-3	Table 3A: Residence Evaluated Receptor			
Benz. (μg/L):	21300	VI Pathway Modeled from AOC GW at MW^{Cmax} Source			
Chemical of Concern (COC)	Calculated GW Concentration at Receptor (μg/L)	GW VI SSTL at Receptor (μg/L)	Below SSTL? (Y/N)	MW^{Cmax} SSTL Protective of Receptor (μg/L)	
Benzene	0.01366	712.1	Yes	N/A	
Toluene	0.03697	530000	Yes	N/A	
Ethylbenzene	0.004947	2413	Yes	N/A	
Xylenes (Total)	0.02839	110000	Yes	N/A	
MTBE	BRV	76070	Yes	N/A	
Naphthalene	BRV	31000	Yes	N/A	

MW^{NR} is:	MW-11	Table 3B: Residence Evaluated Receptor			
Benz. (μg/L):	47.9	VI Pathway Modeled from GW at MW^{NR} Secondary Source			
Chemical of Concern (COC)	Calculated GW Concentration at Receptor (μg/L)	GW VI SSTL at Receptor (μg/L)	Below SSTL? (Y/N)	MW^{NR} SSTL Protective of Receptor (μg/L)	
Benzene	0.01366	712.1	Yes	N/A	
Toluene	0.03697	530000	Yes	N/A	
Ethylbenzene	0.004947	2413	Yes	N/A	
Xylenes (Total)	0.02834	110000	Yes	N/A	
MTBE	BRV	76070	Yes	N/A	
Naphthalene	BRV	31000	Yes	N/A	

MW^{Cmax} is:	MW-3	Table 3A: Perennial Water Body Evaluated Receptor			
Benz. (μg/L):	21300	Direct Exposure (Dir. Exp.) Modeled from AOC GW at MW^{Cmax} Source			
Chemical of Concern (COC)	Calculated GW Concentration at Receptor (μg/L)	GW Dir. Exp. RBTL at Receptor (μg/L)	Below RBTL? (Y/N)	MW^{Cmax} SSTL Protective of Receptor (μg/L)	
Benzene	0.01366	51	Yes	N/A	
Toluene	0.03697	5980	Yes	N/A	
Ethylbenzene	0.004947	2100	Yes	N/A	
Xylenes (Total)	0.02833	193	Yes	N/A	
MTBE	BRV	195	Yes	N/A	
Naphthalene	BRV	6	Yes	N/A	

MW^{NR} is:	MW-9	Table 3B: Perennial Water Body Evaluated Receptor			
Benz. (μg/L):	7700	Direct Exposure Modeled from GW at MW^{NR} Secondary Source			
Chemical of Concern (COC)	Calculated GW Concentration at Receptor (μg/L)	GW Dir. Exp. RBTL at Receptor (μg/L)	Below RBTL? (Y/N)	MW^{NR} SSTL Protective of Receptor (μg/L)	
Benzene	0.01367	51	Yes	N/A	
Toluene	0.03697	5980	Yes	N/A	
Ethylbenzene	0.004947	2100	Yes	N/A	
Xylenes (Total)	0.02855	193	Yes	N/A	
MTBE	BRV	195	Yes	N/A	
Naphthalene	BRV	6	Yes	N/A	

Dashboard

Dashboard User Guide

1. Guidance & Resources
2. Templates & Downloads
3. Save/Restore Data

GRBCA Guidance | GW Benzene VI Outputs

GRBCA REFERENCE Tables | GRBCA Acronyms

Receptor Field Survey Guidance | About GRBCA Version

Click **Next Report** to advance

Select to advance to VI Summary worksheet

Next Report | Save As & Exit

Previous Report | Print Report(s)

Close Dashboard

The AOPC SSTL Report Worksheet Training is now complete.