
RBTL Report Worksheet **Standard Operating Procedure (SOP)**

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

RBTL Worksheet SOP Overview

RBTL Worksheet - General Instruction: Identification of exposure pathways and receptors results from completing a Local Water Resource Survey and Receptor Field Survey. These surveys are prerequisites to completing a GRBCA risk evaluation. A Conceptual Site Model (CSM) Checklist is in the appendices of the Receptor Field Survey Report and captures the applicable CSM exposure pathway and receptors, which help define the GRBCA risk evaluation scenario.

Data Entry Cell and Checkbox Activation/Deactivation: **Deactivated** cells and checkboxes are shaded gray and have a black “x” across the entry cell. **Activated** cells are shaded white and have open entry cells for data input. This activation/deactivation system applies to all three data entry worksheets in the GRBCA Model and reduces the chance of error messages. By default, the workbook opens with all possible pathways and receptors deactivated. When selections are made, alternate cells are automatically deactivated if no data input is required. **For example:** RBTL Table 5B- if an AOC structure is present, the user will either select “Nonresidence” or “Residence.” If the user selects the “Nonresidence” option, the “Residence” selection automatically deactivates.

RBTL Receptor Selections are Universally Enabled Across all Worksheets: When a receptor is selected in RBTL Items 1-7, the receptor selection is automatically enabled on all worksheets. **For example:** in RBTL Table 6B, a drinking water well (*dww*) receptor is selected as “Present” and a Surface Water Intake (*swi*) receptor is selected as “Not Present”. On the AOPC SSTL Report worksheet, Table 1C, the *dww* data entry row will automatically activate (white) and the *swi* data entry row will remain deactivated (gray). This application ensures all worksheet receptor elements are evaluated if “Present” within the RBTL worksheet and across all other worksheets or if “Not Present”, no receptor evaluation will occur.

RBTL Report Outcomes: The current and highest concentration sample results determined during the site investigation are entered and compared to the USTMP established GRBCA RBTLs. The results of the comparison are published in Item 11 of this worksheet and determine if the risk evaluation advances to the next worksheet evaluation. Almost all petroleum release sites fail the RBTL soil and/or groundwater (GW) comparison. The next risk evaluation step establishes the applicable AOC GW site-specific threshold levels (SSTLs).

Soil Analytical Results Workbook Evaluation Process: The GRBCA Workbook evaluates all COC analytical results entered and selects the maximum concentration for each COC (soil and GW). The maximum concentration soil analytical results will be compared to the established RBTLs and will either pass or fail the comparison. Soil analytical results are not evaluated further in the RBTL Report; however, vadose soil contamination does affect GW evaluations from the soil to GW leaching algorithm.

GW Analytical Results Workbook Evaluation Process: For GW analytical results, the user will select the AOC MW with the highest GW benzene concentration at the time the evaluation is completed.

Benzene has the greatest toxicity of any evaluated COC and is the reason the maximum GW benzene MW is selected to represent the source area. All COC data for this MW, as well as up to five (5) additional MWs, will be entered in RBTL Table 9 (Maximum Concentration Monitoring Well Analytical Results). The maximum concentration GW benzene MW will be the anchor MW location to represent the GW source area (release point) and will be used to provide key distances used in the workbook algorithms.

The workbook will scan all results entered for each COC and then select the maximum COC concentration. Each maximum COC concentration is then assigned to the MW with the highest GW benzene concentration. The new workbook created “maximum concentration COC MW” (MW^{Cmax}), now represents the maximum COC concentrations for the entire GW contaminant plume source area. This ensures the GW contaminant plume is conservatively evaluated and is based upon the maximum concentration GW benzene MW location.

If GW benzene is not present or is presents noticeably low concentrations compared to other COCs, then the user should select another MW based on the following COC risk-based hierarchy (highest to lowest priority): MTBE, toluene, total xylenes, ethyl benzene and naphthalene.

RBTL Report Standard Operating Procedure (SOP)

A. RBTL Worksheet Guide: Data Entry and Checkbox Selections (Line Items 1 through 7)

Line Items 1 through 7 define the base risk evaluation scenario the workbook will use to complete the initial RBTL evaluation. Worksheet data and selections must be accurate and represent actual site conditions. The scenario will be updated with additional information on the AOC and AOPC SSTL worksheets.

1. Date this GRBCA Workbook evaluation completed?

- i. Enter the date that the RBTL report is completed using calendar order: *FIRST*, select the **month**; *SECOND*, select the **year**; and, *THIRD*, select the **day**.
 - a. The default highlighted calendar date will be the current date. Select the date field by tabbing into the cell or select with mouse to open a calendar view.

2. Date confirmed release reported to USTMP?

- i. Enter the confirmed release date (i.e., the date the confirmed release reported to the USTMP).

3. Facility Information

3A. Facility Name <small>(LEMIR Location Name)</small>	3B. Facility ID <small>(LEMIR Location Identifier)</small>	3C. Facility County
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- 3A. **Facility Name**- Enter the Facility Name (GEOS/LEMIR Project Name)
- 3B. **Facility ID**- Enter the Facility ID number (GEOS/LEMIR Location Identifier)
- 3C. **Facility County**- Enter the Facility County. The county cell contains an autocomplete dropdown box. Start typing the name of the selected county and the county name will auto-populate. Select keyboard “Tab” or “Enter” to advance to the next data entry cell.

4. Type of Petroleum Product(s) Released

Table 4: Type of Petroleum Product(s) Released

- i. Select the applicable checkbox for the petroleum product(s) released at the site. Only one checkbox may be selected.
 - a. If the products released are gasoline in combination with diesel, kerosene or jet fuel or used oil, then check the “Gasoline/Diesel/Kerosene/Jet Fuel/Used Oil” checkbox.
 - b. If the product(s) released at the site are unknown, are a combination of any known and unknown substances or if other COCs besides BTEX, Naphthalene and MTBE are detected, select the “Unknown” checkbox. *(NOTE: If a release occurred from more than one tank pit/area of the site, a separate GRBCA workbook must be completed and submitted for each tank pit/area).*

5. Applicable Structures located within 500 feet of the Release Point

Table 5A: Data Source Reference

5A. Data Source Reference- Provides a calendar date cell and a drop-down menu to identify the date and name of the report that verifies the user’s entries and selections in Tables 5B (Nearest AOC Structure within the 500ft of the Release Point) and 5C (Nearest AOPC Structure(s) within the 500ft of Release Point). Documenting the source of information used in the risk evaluation is a critical element to validate the evaluation.

1. **Date-** Manual entry for the date of the data source reference report used for data input.
2. **Report Name-** Manual entry for the name of the data source reference.
3. **Data Source Reference Checkbox - red and black** checkbox in the last column of table. This checkbox generates the report name and report date in Table 5A to all RBTL Report Data Source references.
 - i. This checkbox appears on the AOC and AOPC SSSL Report worksheets. If the Data source is mostly from the same report, then it is advantageous to select this checkbox and populate each report entry on the worksheet.
 - ii. **NOTE:** Populated individual cells can be updated during any worksheet completion cycle. At any time prior to the worksheet being finalized (selecting the green command button located on each of the RBTL and both SSSL worksheets) the user may deselect this checkbox to erase populated entries if a more prevalent Data Source entry is identified.

5B and 5C. Nearest AOC and AOPC Structure within the 500ft Survey Distance

Table 5B: Nearest AOC Structure within the 500 ft Survey Distance

Table 5C: Nearest AOPC Structure(s) within the 500 ft Survey Distance

Considerations for Structure Foundation Type for Table 5B and 5C

Foundation types affect depth to groundwater considerations and impact the VI screening evaluation. Most AOC facilities are nonresidential, slab-on-grade evaluations. The nearest down gradient or cross gradient AOPC residence and/or non-residence structure may be a slab-on-grade or basement structure.

Select the applicable foundation type for the AOC structure and the **nearest** down gradient or cross gradient AOPC residential **and** nonresidential structure, if identified in the Receptor Field Survey.

- a. The three (3) key structures being evaluated for groundwater to indoor air vapor intrusion are:
 1. AOC (onsite) Structure
 2. Nearest AOPC (offsite) and down gradient residence located within 500 feet of the release point
 3. Nearest AOPC (offsite) and down gradient nonresidence located within 500 feet of the release point.
- b. If any of these three (3) structure foundation types are a crawl space, further evaluation of the crawl space is necessary. Project Officer approval is necessary to complete a crawl space evaluation to determine if the crawl space ventilation, HVAC system and other factors will support an equivalent slab-on-grade determination (for workbook evaluation purposes). **A slab-on-grade equivalent foundation determination is made if the verification of the following crawl space criteria is met:**
 1. The perimeter foundation crawl space ventilation system meets minimum local building codes
 2. HVAC supply/return ducts do not leak resulting in indoor air communication with crawl space air
 3. The main subfloor of the structure contains no unobstructed perforations allowing indoor air communication with crawl space air

Reset Option for Table 5B and 5C

Table 5B and 5C contain checkbox selections that follow the automatic activation/deactivation process. An error message may occur if there is a problem with the automatic process (cells are not appropriately active/closed). Since several selection changes in this table can be made before the worksheet is finalized, both tables have a reset button to clear the table and begin again.

IMPORTANT NOTE ABOUT GW FLOW DIRECTION: *GW flow direction that is indeterminant and/or where GW elevations are shallower around the active or former UST system source area is to be evaluated as radial GW flow; therefore, all AOPC structures are considered down gradient.*

5B. Nearest AOC Structure within 500 feet of the Release Point

Table 5B: Nearest AOC Structure within the 500 ft Survey Distance

1. **AOC Structure-** Determine if structure receptor is present. If present, determine usage (residence/nonresidence).
 - 1a. **Present**- If structure is present, select “Present” checkbox
 - 1b. **Not Present**- If no structure is present, select the “Not Present” checkbox
 - 1c. **Nonresidence**- Nonresidents are commercial workers or employees that work in a Nonresidence (business).
 - 1d. **Residence**- Residents are adults and/or children who live in a Residence (single family unit or multi-family dwelling).

Example: a family living at a gas station requires the gas station to be evaluated as Residence
2. **Structure Foundation Type-** Select AOC Structure Foundation Type. When a structure is selected, the user will also select the applicable foundation type, which is either based upon the former structure foundation or controlled by the site topography.
 - 2a. **Slab**- This selection includes evaluated crawl space
 - 2b. **Basement**

5C. Nearest AOPC Structure(s) within 500 feet of the release point

**Table 5C: Nearest AOPC Structure(s)
within the 500 ft Survey Distance**

1. **AOPC Structure-** If identified within 500 feet of the release point during the Receptor Field Survey, select the AOPC Residence and/or Nonresidence checkbox. Both checkboxes can be selected if both structure types are present.
 - i. For multiple residences and/or nonresidences located within the survey area, the applicable structure for each type is nearest to the release point and located in a down gradient or laterally down gradient direction.
 - ii. For like structures of similar distance from the release point, the determining criteria may be foundation type. A basement has greater risk compared to a slab and should therefore be selected.
- 1a. **Present**- If structure is present, select “Present” checkbox
- 1b. **Not Present**- If no structure is present, select the “Not Present” checkbox
- 1c. **Nonresidence**- Nonresidents are commercial workers or employees that work in a Nonresidence (business).
- 1d. **Residence**- Residents are adults and/or children who live in a Residence (single family unit or multi-family dwelling).
2. **Structure Foundation Type-** Select AOC Structure Foundation Type. When a structure is selected, the user will also select the applicable foundation type, which is either based upon the former structure foundation or controlled by the site topography.
 - 2a. **Slab**- This selection includes evaluated crawl space
 - 2b. **Basement**

6. Groundwater (GW) and Surface Water Receptor Selections (Table 6A and 6B)

Table 6A: Groundwater Use Determination within the 500 foot Survey Distance

Table 6B: GW &/or SW Receptors within the 500 ft Survey Distance

Considerations for Table 6A and 6B

Table 6A and 6B are linked through the activation/deactivation application. When “Yes (drinking water)” checkbox is selected in Table 5A, the “No (non-drinking water)” checkbox is deactivated, and Table 6B selections are activated/deactivated accordingly. The Perennial Water Body Receptor selection in Table 6B is not affected by the activation/ deactivation application

6A. Is GW Used for Drinking Water within 500 feet of the Release Point?

Table 6A: Groundwater Use Determination within the 500 foot Survey Distance

- i. Select the applicable checkbox for the current groundwater usage determination at the site as assessed during the Receptor Field Survey. (*Note: Existing release sites may not have this information readily updated. The transition of current release sites to ensure adequate risk-based documentation will require USTMP Project Officer Approval to assemble any necessary information to complete the GRBCA Workbook.*)
- ii. Select the “Yes (Drinking Water)” checkbox if the drinking water supply is onsite or offsite and within a five hundred (500) foot radius of the release point in a down gradient or cross

gradient direction and is the only water supply for that property. The USTMP will make every effort to replace any at risk water well supply with a municipal supply, if available.

- iii. Any identified water supply considered for exclusion will require justification. The following example records a successful determination to exclude an active water well from the risk evaluation:

Example: A UST facility gasoline release results in 26,000 ug/L GW benzene, average free product thickness of one foot in 5 of 30 MWs and GW elevation is 15 feet below ground surface (bgs), but often fluctuates between 10 and 18 feet. The soil is a clayey sand with some clay aquitards. The dissolved plume has migrated 160 feet from the release point and has stabilized as confirmed by delineation MWs. A down gradient to laterally down gradient, active water well is present at 450 feet from the release point. The water well is believed to be 500 feet deep, though no data confirms the information. Other water wells in the area are known to draw water from similar depths. A GW COC concentration analytical history began when the water well was identified at the beginning of the release investigation. Monitoring has continued with regular frequency and independent of the release investigation report submittal schedule. Though no Well Completion Data Form can be located, most water wells in the area are cased to the Floridan aquifer as determined by the consultant. The local geology and hydrology support this interpretation. The sample history includes 15 analytical results covering a 24-month period up to the CAP-Part B preparation. Results are ND for all applicable GRBCA COCs.

The total of all information indicates the well is not at risk and is excluded from the risk evaluation. The sample history will continue to be appended quarterly and with the quarterly reporting schedule established for the site through the full term of remediation and post remediation monitoring to ensure the supply is not impacted.

NOTE: A single water well sample collected some time during a release investigation is inadequate to eliminate the water well receptor from the risk evaluation. The single water sample does in fact confirm the water quality at the time the sample was collected.

6B. GW & Surface Water (SW) Receptors located within 500 feet of the Release Point

Table 6B: GW &/or SW Receptors within the 500 ft Survey Distance

1. Drinking Water Well (*dww*)

- 1a. **Present-** Select the Drinking Water Well (*dww*) “**Present**” checkbox” if a (*dww*) is identified within 500 feet of the release point. If more than one (*dww*) is present within the 500-ft survey distance, evaluate the (*dww*) in the most downgradient position and closest to the release point. If both a public water supply well and a private water supply well are of equal distance to the release point, both draw water from a shallower aquifer and are similarly located downgradient from the release point, evaluate the public well because the drawdown will be much higher and the risk of exposure much greater to a larger segment of the population.
- 1b. **Not Present-** If no (*dww*) is present, select the “**Not Present**” checkbox.

2. Surface Water Intake (*swi*)

- 2a. **Present-** Select the Surface Water Intake (*swi*) “**Present**” checkbox if a (*swi*) is identified within the 500 feet of the release point. A (*swi*) located cross gradient or down gradient from the release point is to be selected as “**Present.**”
- 2b. **Not Present-** The (*swi*) may be excluded if the withdrawal point is clearly topographically upgradient and upstream of the release point. If the (*swi*) is up gradient of the site, then this receptor should not be evaluated. If there is no (*swi*) gradient of the site, then this receptor should not be evaluated. If there is no (*swi*) located within 500 feet of the release point, then select the “**Not Present**” checkbox.

3. Perennial Water Body (*pwb*)

- 3a. Present**-Select the (*pwb*) “**Present**” checkbox if a down gradient or cross gradient, perennial surface water body is located within a five hundred (500) foot radius of the site. Ephemeral or intermittent surface water conveyances located within five hundred (500) feet of the release point that may or may not supply a perennial water body resource are omitted from consideration.
- 3b. Not Present**- If there is no (*pwb*) gradient of the site, then this receptor should not be evaluated. If there is no (*pwb*) located within 500 feet of the release point, then select the “**Not Present**” checkbox.

7. Applicable Structure, Vapor Intrusion Inclusion Screening Parameters

7A. AOC Structure Distance to Nearest Vadose Benzene Soil Analysis Result

**Table 7A. AOC Structure
Distance to Nearest Soil
Benzene Sample Result**

1. **Select N/A if no building and/or soil benzene is present. If there is a structure, leave blank and continue.**
 - i. If any of the following apply, omit results from consideration and select the “N/A” checkbox in the table.
 1. No vadose soil benzene concentration ≥ 0.1 mg/kg is identified
 2. Vadose soil results four (4) or more years old. Results are no longer representative. The Project Officer should be consulted for approval to resample if the expired results were above applicable soil thresholds defined by UST Rules
 3. Saturated soil samples
 4. Soil samples collected just above the water table and/or within the “smear zone”
2. **Distance**- Enter the lateral distance from the structure to the nearest **vadose** soil sample containing ≥ 0.1 mg/kg benzene identified for this investigation. Include UST system closure soil samples, if applicable.
3. **MW ID or Sample ID**- Enter the reference source of the data
4. **Data Source**- This section identifies where the data can be verified. The information will be entered in 4a-4c.
 - 4a. **Figure**- Table or figure title/number of the source of data in the report
 - 4b. **Date**- Date of the report
 - 4c. **Report Name**- Use the dropdown menu to select the report name

7B. AOC (onsite) Structure Distance to Nearest Free Product (FP) MW

**Table 7B. AOC Structure
Distance to Nearest
Free Product (FP) MW**

1. **Select N/A if no Free Product is present, No Free Product condition is present (benzene concentration $\geq 15,000$ ug/L) and No Structure present. If there is a structure, leave checkbox blank and continue.**

2. **Distance**- Enter the lateral distance from the structure to the nearest **MW** containing FP or \geq 15,000ug/L GW benzene identified for this investigation.
3. **MW ID**- Enter the MW ID that the FP or FP condition is located.
4. **Data Source**- This section identifies where the data can be verified. The information will be entered in 4a-4c.
 - 4a. **Figure**- Table or figure title/number of the source of data in the report
 - 4b. **Date**- Date of the report
 - 4c. **Report Name** -Use the dropdown menu to select the report name

7C. AOPC (offsite) Residence Distance to Nearest MW with detectable* COC's
 * "detectable" refers to 50% of the maximum GW COC concentrations

Table 7C. AOPC Residence Distance to Nearest MW with Detectable COCs

If the pathway is not evaluated, Table 7C will be deactivated.
 If the pathway is valid return to Table 5C (Nearest AOPC Structure(s) within 500ft of Release Point) to confirm data entry.

1. **Distance**- Enter the lateral distance from the nearest monitoring well with groundwater detectable COC concentrations to the nearest down gradient or cross gradient residence. Avoid low detection MWs near receptor and select a MW located between the GW source MW and receptor, where GW benzene values are half or less of the source MW concentration.
detectable COCs= those that are 50% of the maximum GW COC concentration
2. **MW ID** - Enter the reference source of the data
3. **Data Source**- This section identifies where the data can be verified. The information will be entered in 4a-4c.
 - 3a. **Figure**- Table or figure title/number of the source of data in the report
 - 3b. **Date**- Date of the report
 - 3c. **Report Name**- Use the dropdown menu to select the report name

7D. AOPC (offsite) Nonresidence Distance to Nearest MW with detectable* COC's
 *"detectable" refers to 50% of the maximum GW COC concentrations

Table 7D. AOPC Nonresidence Distance to Nearest MW with Detectable COCs

If the pathway is not evaluated, Table 7D will be deactivated.
 If the pathway is valid, return to Table 5C (Nearest AOPC Structure(s) within 500ft of Release Point) to confirm data entry.

1. **Distance**- Enter the lateral distance from the nearest monitoring well with groundwater detectable COC concentrations to the nearest down gradient or cross gradient nonresidence. Avoid low detection MWs near receptor and select a MW located between the GW source MW and receptor, where GW benzene values are half or less of the source MW concentration.
detectable COCs= those that are 50% of the maximum GW COC concentration

2. **MW ID**- Enter the reference source of the data
3. **Data Source**- This section identifies where the data can be verified. The information will be entered in 4a-4c.
 - 3a. **Figure**- Table or figure title/number of the source of data in the report
 - 3b. **Date**- Date of the report
 - 3c. **Report Name**- Use the dropdown menu to select the report name



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

- a. Review all entries for accuracy.
- b. Select the **activated** (green with white text) **Green** command button. Selections will be “1. Create COC & RBTL Tables” or “2. Compare COC’s to RBTLs.”

B. RBTL Worksheet SOP: Imported Tables and Data Entry (Line Items 8 through 11)

8. Sub-surface Soil Analytical Results Tables

Considerations for Workbook Soil Data Table Creation and Import Options

The table(s) imported by the workbook for Item 8 will either be:

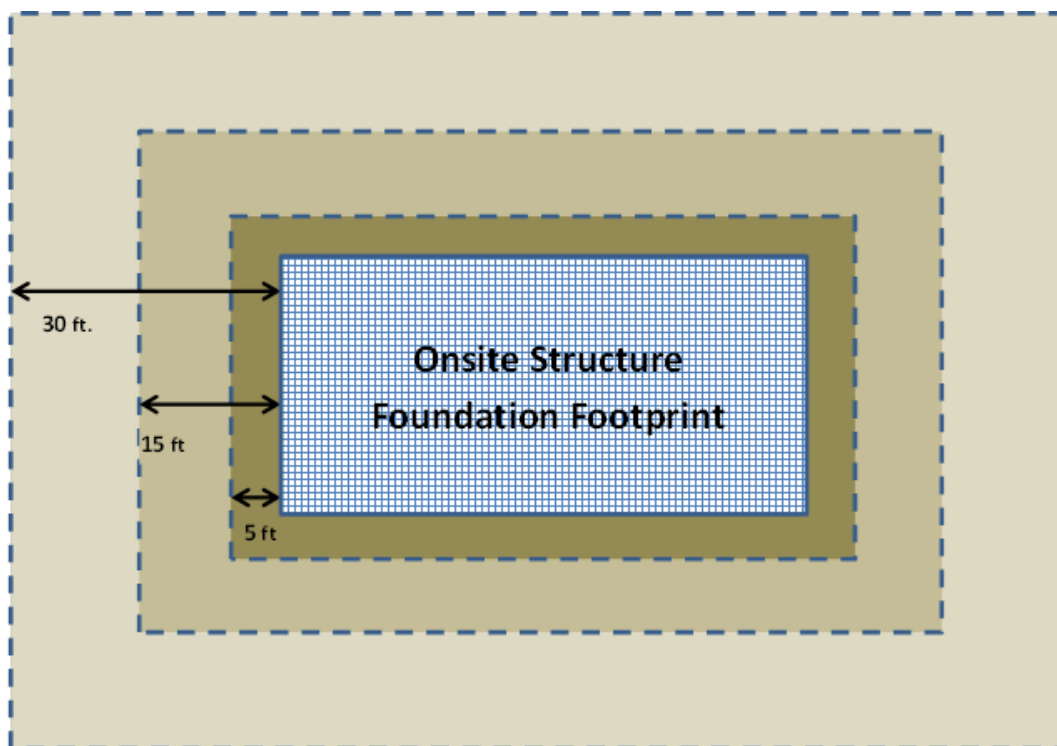
- i. **Option 1- Soil Vapor Intrusion (VI) Screening and Direct Exposure Soil COC Analytical Results.**
 - a. The workbook imports two (2) soil analytical results tables. RBTL Table 7A triggers which table import is completed. If benzene concentrations in soil are present within thirty (30) feet of the AOC onsite structure, then Table 8A and 8B are created and imported:
 1. **Table 8A Sub-surface Soil Benzene Inclusion Screening: VI Exposure Pathway**- for soil benzene analytical results data entry to complete the soil VI screening evaluation comparing soil sample location and soil benzene analytical results to a VI RBTL matrix based on defined distances and depths from the onsite structure.
Soil data points are to be selected from the vadose zone.
 Saturated soil samples or soil samples analyzed just above the water table and/or within what is considered the “smear zone” are to be omitted from sample selection consideration. The smear zone will be different for all sites and will be more readily identifiable from sites that have more extensive potentiometric data history.
 Newer releases with soil contamination above the water table will be more subject to professional judgment by both consulting professionals and the USTMP project officer.
 2. **Table 8B Direct Exposure Pathways: Max Concentration Vadose Soil Analytical Results**- for soil COC analytical results data entry to complete the direct exposure evaluation comparing the direct exposure soil COC analytical result to the direct exposure soil RBTLs.
- ii. **Option 2- Direct Exposure Soil COC Analytical Results (with no soil VI screening evaluation).**
 - a. The workbook imports one (1) soil analytical results Table 8

8A. Sub-surface Soil Benzene Inclusion Screening: VI Exposure Pathway

Table 8A: Sub-Surface Soil Benzene Inclusion Screening: VI Exposure Pathway

- i. PRIOR to data entry for Table 8A, complete the following steps:
 2. Using a copy of a scaled Soil Quality Map from a current report. Insure the existing onsite structure and any recent UST System Closure Report soil data (if applicable) is depicted.
 3. Locate and show the lateral screening distance zones at five (5), fifteen (15) and thirty (30) feet on the map from the existing structure's exterior walls. The newly drawn lines around the existing onsite structure should appear like Figure 4 – Lateral Soil Benzene Inclusion Zones (shown below).
 4. This amended map, along with the applicable soil data tables are used to manually complete Table 8A.

Figure 4: Lateral Soil Benzene Inclusion Zones



- ii. Enter soil benzene data into the correct grid zones in RBTL Table 8A - Soil Benzene Inclusion Screening: Vapor Intrusion (VI) Exposure Pathway. **Complete the following steps:**
 - a. Table 8A assumes the corner of the exterior wall and foundation of the onsite structure is in the upper left-hand corner of the table. Identify the correct distance (X axis) and depth (Y axis) from the structure for all applicable soil benzene data and record each benzene analytical result ≥ 0.1 mg/kg in the corresponding distance and depth grid zone in the table
 - b. For soil analytical results from borings, record all vadose benzene sample results using the exact collection depth (in feet) if known or the shallowest depth for the sample interval for each sample analyzed.

Example: A 0.4 mg/kg benzene soil analytical result originated from a sample b-3 4-9 collected on 10/21/2019 from a four (4) to nine (9) foot split spoon and at 12 lateral feet from the structure. The exact sample collection depth has not been recorded, so the sample depth to

conservatively enter in the workbook is four (4) feet (the shallowest depth of the sample interval). The correct grid placement in the table for the 0.4 mg/kg benzene result is: depicted in the example soil VI table below.

- c. If more sample results exist for a grid zone than the table provides, record the highest benzene soil sample results for that grid zone and omit lower benzene concentrations.

Table 8A: Sub-surface Soil Benzene Inclusion Screening: VI Exposure Pathway									
Lateral Distance from AOC Structure Foundation (feet)									
On-site Structure	<5			≥5 to <15			≥15 to <30		
	Sample ID #	Sample Date	Benzene Conc.* (mg/kg)	Sample ID #	Sample Date	Benzene Conc.* (mg/kg)	Sample ID #	Sample Date	Benzene Conc.* (mg/kg)
Vertical Distance From Surface (feet)	<5			b-3 4-9	10/21/2019	0.4000			
	≥5 to <15								
	≥15 to <30								

* Use soil analytical data from the investigation and if applicable, UST system closure. This table does not use soil gas analytical data.

(Continued on next page)

8B. Direct Exposure Pathways: Maximum Concentration Vadose Soil Analytical Results

Table 8B: Direct Exposure Pathways: Maximum Concentration Vadose Soil Analytical Results

- a. Table 8B is created and imported to capture other exposure pathway soil analytical results. **Record the following information:**
1. From Table 8A, record the three (3) highest benzene soil analytical results in the first three (3) columns.
 2. Record the other COC analytical results that correspond to these three soil benzene results.
 3. The remaining three (3) columns are for recording the highest vadose soil sample COCs located greater than or equal to thirty (30) feet laterally from the AOC structure.

Table 8B: Direct Exposure Pathways: Max Concentration Vadose Soil Analytical Results						
Sample Distance	< 30 feet from AOC structure*			≥ 30 feet from AOC structure		
Sample ID #	MW-3			MW-2	MW-6	
Sample Date	10/21/2019			10/21/2019	10/21/2019	
Depth (ft)	4.00			8.00	6.00	
COCs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	0.40			0.52	9.48	
Toluene	0.54			2.92	64.50	
Ethylbenzene	0.08			0.13	16.40	
Xylenes (Total)	0.36			5.75	79.60	
MTBE	0.01			0.15	0.29	+
Naphthalene	0.00			14.30	89.00	

* From table 8A above, enter the three (3) highest benzene and related COC concentration analytical results

8: Direct Exposure Pathways: Max. Concentration Vadose Soil Analytical Results (no VI evaluation determined)

Table 8: Direct Exposure Pathways: Max. Concentration Vadose Soil Analytical Results

- i. If no soil benzene results ≥ 0.1 mg/kg exists within thirty (30) feet of the AOC structure, the GRBCA workbook will import Table 8 - Maximum Concentration Vadose Soil Analytical Results.
 - a. Enter the applicable soil sample COC concentrations and depths for up to six (6) samples. The data for vadose soil samples are from the most current sampling event(s) (release investigation and, if applicable, UST system closure) with the maximum benzene concentrations in soil within the AOC.
 - b. If soil benzene concentrations are not present, enter data from the samples with the highest concentration from the applicable COCs in this order: MTBE, toluene, total xylenes, ethyl benzene and naphthalene.
- ii. Depths entered in the worksheet must be between three (3) feet and thirty (30) feet below ground surface.
 1. For worksheet data entry from soil borings, if the exact sample depth is not known, enter the shallowest sample depth for the specified sampling interval.

Example: If a soil sample was collected between four (4) and nine (9) feet, enter a depth of four (4) feet into the worksheet. If applicable, enter at least one soil sample analytical result from a depth between three (3) and ten (10) feet.

- iii. Enter all sample concentration results as they appear on the laboratory data sheets.
 - 1. If the sample result for any COC is reported to be below the laboratory detection limit (i.e., “ND,” “BDL,” “<number,” etc.), enter a less than (<) symbol followed by the actual reported detection limit that appears on the laboratory analytical sheet.

Example: If the sample results are below the reported laboratory analytical detection limit and the referenced limit is “<0.005 mg/kg,” enter “<0.005” or “0.0049” in the analytical results table

9. Groundwater Analytical Results Table

Table 9: Maximum Concentration Monitoring Well Analytical Results

- i. Enter the sample date, sample location (i.e. monitoring well number) and COC concentration (µg/L) for the most recent groundwater sampling event.
 - a. A maximum of six (6) groundwater samples can be entered.
 - b. The analytical results selected are from the monitoring wells containing the highest benzene concentrations.
 - 1. If benzene is not present, the analytical results selected are based on the following order of maximum concentration: MTBE, toluene, total xylenes, ethyl benzene or naphthalene.
 - c. If the sample result for any COC is reported to be below the laboratory detection limit (i.e., “ND,” “BDL,” “BRL,” “<number,” etc.), enter a less than (<) symbol followed by the actual reported method detection limit that appears on the laboratory analytical sheet.

Example: If the sample results are below the reported laboratory analytical detection limit and referenced limit is “<0.005 mg/l,” enter “<0.005” or “0.0049” in the analytical results table.

NOTE: Any analytical results entered in the workbook that are above the detection limit for the method, must use the actual analytical result with no qualifier (i.e. “<” symbol). Above detection limit sample results that lead with the “<” symbol are generated by laboratories diluting the sample to keep from saturating/shutting down gas chromatography equipment. Additionally, because of the dilution factor, the analytical result is not actual and therefore uncertain or invalid. **Analytical results above detection limits and reported with a qualifier (i.e. <2500, <500 or <100, etc.) cannot be entered into workbook using the “<” symbol.** This may cause a type mismatch error message and will prevent the user from completing the workbook. If the qualified analytical result is needed, then the MW should be resampled, and laboratory provide an analytical result that has no qualifier. Otherwise, the most conservative entry for a “<500” result is “499” and will be evaluated by the workbook.

- b. If two (2) different aquifers have been impacted, a separate GRBCA Workbook for each aquifer will be required- **Confirm with the Project Officer before completing a separate workbook.**

10. Data source for soil and GW analysis results entered in this workbook

Table 10: Report Name

- i. Select the name of the report from the dropdown menu where the soil analytical results data can be verified. This may already be populated if the red and black checkbox located in RBTL Table 5A was used.
- ii. Select the date cell and a calendar will appear.
 - 1. If the report date is not listed in the Date History Selection Table, then select the month, year and day of the report and the calendar will close. If the date is present in the table,

then hover the mouse cursor over the date selection and double click and the date will import. The calendar will stay open when dates are selected from the table and remain open until the user closes the calendar.

After completing Item 10, the following banner is present:

STOP: Review tables for completeness. Return to Item #8, above. Select "2. Compare COCs to RBTLs" button to finish the RBTL report.

Follow the instructions in the yellow text above to return to the stop sign area



After entering data in Items 8 through 10, return to the RBTL **STOP** sign located above Item #8. Follow instructions to finalize Items 8-10, and the worksheet.

- a. Select the activated **green** command button to compare the COC concentrations and RBTLs.
- b. The workbook displays a pop-up message providing PASS/FAIL results of the comparison and instructs the user to select the Dashboard "**Next Report**" button to advance to the next worksheet.
- c. The workbook will then complete and import Item 11, comparison results tables before finalizing the RBTL Report worksheet.

C. RBTL Worksheet SOP: Results - Applicable RBTLs and COC Comparison Tables

11. Applicable RBTLs and Comparison Tables:

- i. **Sub-surface Soil Vapor Intrusion Inclusion Screening RBTL Comparison Table 8A**
 - a. If soil vapor intrusion screening for the AOC structure was completed using Table 8A, then a table comparing the benzene in soil analytical results to the soil RBTLs will be displayed and the results of the comparison completed.
- ii. **Sub-surface Soil and Groundwater RBTL Comparison Table 11A – 11C**
 - a. Soil COCs will be fully evaluated in the RBTL worksheet and will not be further evaluate. The only exception to this statement is when a direct exposure groundwater receptor is present and maximum soil COC concentrations are used in the soil to groundwater leaching algorithm.

NOTE: in the case of some COCs, the applicable RBTL may be less than the current technological capabilities for laboratory analytical equipment. In these instances, the worksheet may display a "No." If a value of "<Detection Limit Concentration" was entered in the worksheet for any COC and "No" is displayed, the COC **did not fail** and the requested ACL for the COC will be the SSTL displayed in the Summary Report.

- b. **Table 11A: Sub-surface Soil Benzene RBTL Comparison to Soil Benzene Concentrations** If soil vapor intrusion screening for the AOC structure was completed using Table 8A, then Table 11A presents the specific comparison results. If soil vapor intrusion screening for the AOC structure was not completed, then a "Not Applicable" message will appear.
- c. **Table 11B: AOC Sub-surface Soil Benzene RBTL VI Screening Results: Slab-on-grade Structure** summarizes each grid zone to simplify the table presentation. The comparison of the benzene in soil analytical results to the soil RBTLs is included in the summary table.
- d. **Table 11B: AOC Sub-surface Soil Direct Exposure Results** If direct exposure soil analytical results were evaluated by completing either Table 8B in Option 1 or Table 8 in Option 2, then another sub-surface soil table for direct exposure soil analysis will be displayed. This table will compare the applicable COC soil analytical results to the direct exposure RBTLs. Whenever an AOPC receptor is selected and the Domenico model is used,

all six (6) columns in Table 8B are used for the selecting the maximum concentrations for each COC to evaluate the soil to groundwater leaching algorithm.

- e. **Table 11C: AOC GW Results** This table will compare the applicable GW COC analytical results to the GW to indoor air vapor intrusion exposure pathway RBTLs.

iii. “Below RBTLs Y/N” column

- a. Each table displays the RBTL comparison results of all benzene in soil concentrations (if applicable), maximum direct exposure soil COC concentrations and maximum groundwater COC concentrations.
 - 1. “Yes” indicates that the COC concentration is lower than the applicable RBTL.
 - 2. “NO” indicates that the COC concentration is at or above the applicable RBTL.