California Air Resources Board
and California Air Pollution Control Officers Association

Gasoline Service Station Risk Tool User Guide

February 18, 2022

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I. Introduction

The development of the 2022 Gasoline Service Station Industrywide Risk Assessment Technical Guidance (Technical Guidance) included two tools created to assist local Air Pollution Control Districts and Air Quality Management Districts (Districts) in performing screening health risk assessments. The two tools follow the Technical Guidance and allow District staff access to customize their Health Risk Assessments (HRAs). The tools were created using Excel 2016 on a Windows 10 system. Operating issues may occur on other systems. The first tool, known as the Look-up Tool, allows the user to select from predetermined modeling results and scale risk results by facility specific emissions. The second tool, known as the Variable Meteorology Tool, allows the user to supply meteorology that is more appropriate for their facility and to modify some modeling and emission factor assumptions. This allows the user to match any existing District policy.

II. Look-up Tool

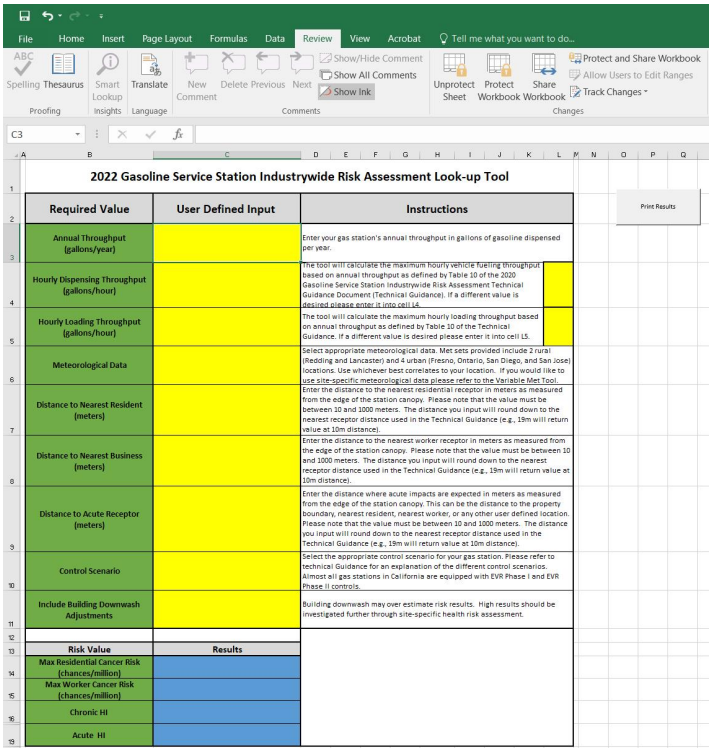
A. Downloading the Look-up Tool

To download the Look-up Tool please visit *Gasoline Service Station Industrywide Risk Assessment Guidance | California Air Resources Board*.

B. Opening the Look-up Tool

Select the Look-up Tool.xlsm file from the downloaded folder in *Section II.A* above. The file will open an excel worksheet that functions as the input and output for the tool. If prompted, the user should enable editing in order to use the tool. On this screen, the user can enter any inputs required to generate screening risk results based on the assumptions used in the Technical Guidance. User-defined values are entered into the yellow cells and risk results are displayed in the blue cells below. Once all yellow cells are filled in, risk results will be displayed. The spreadsheet also includes a column with instructions that acts as a quick reference for each user input needed.

Figure 1 - Look-up Tool on Startup



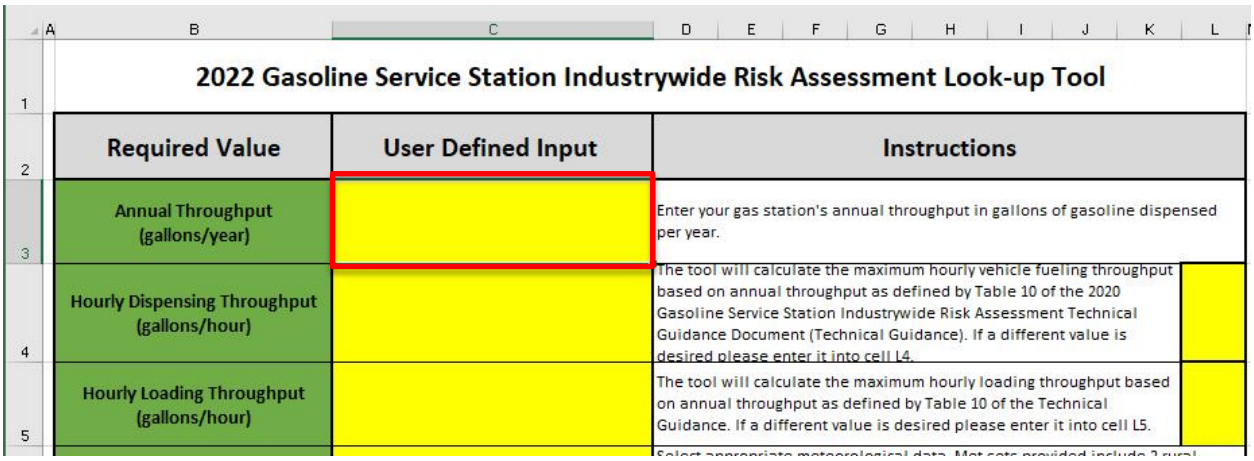
2022 Gasoline Service Station Industrywide Risk Assessment Look-up Tool

Required Value	User Defined Input	Instructions
Annual Throughput (gallons/year)		Enter your gas station's annual throughput in gallons of gasoline dispensed per year.
Hourly Dispensing Throughput (gallons/hour)		The tool will calculate the maximum hourly vehicle fueling throughput based on annual throughput as defined by Table 10 of the 2020 Gasoline Service Station Industrywide Risk Assessment Technical Guidance Document (Technical Guidance). If a different value is desired please enter it into cell L4.
Hourly Loading Throughput (gallons/hour)		The tool will calculate the maximum hourly loading throughput based on annual throughput as defined by Table 10 of the Technical Guidance. If a different value is desired please enter it into cell L5.
Meteorological Data		Select appropriate meteorological data. Met sets provided include 2 rural (Redding and Lancaster) and 4 urban (Fresno, Ontario, San Diego, and San Jose) locations. Use whichever best correlates to your location. If you would like to use site-specific meteorological data please refer to the Variable Met Tool.
Distance to Nearest Resident (meters)		Enter the distance to the nearest residential receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Distance to Nearest Business (meters)		Enter the distance to the nearest worker receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Distance to Acute Receptor (meters)		Enter the distance where acute impacts are expected in meters as measured from the edge of the station canopy. This can be the distance to the property boundary, nearest resident, nearest worker, or any other user defined location. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Control Scenario		Select the appropriate control scenario for your gas station. Please refer to technical Guidance for an explanation of the different control scenarios. Almost all gas stations in California are equipped with EVR Phase I and EVR Phase II controls.
Include Building Downwash Adjustments		Building downwash may over estimate risk results. High results should be investigated further through site-specific health risk assessment.

Risk Value	Results
Max Residential Cancer Risk (chances/million)	
Max Worker Cancer Risk (chances/million)	
Chronic HI	
Acute HI	

C. Entering Throughput

Figure 2 - Throughput Inputs Unfilled



2022 Gasoline Service Station Industrywide Risk Assessment Look-up Tool

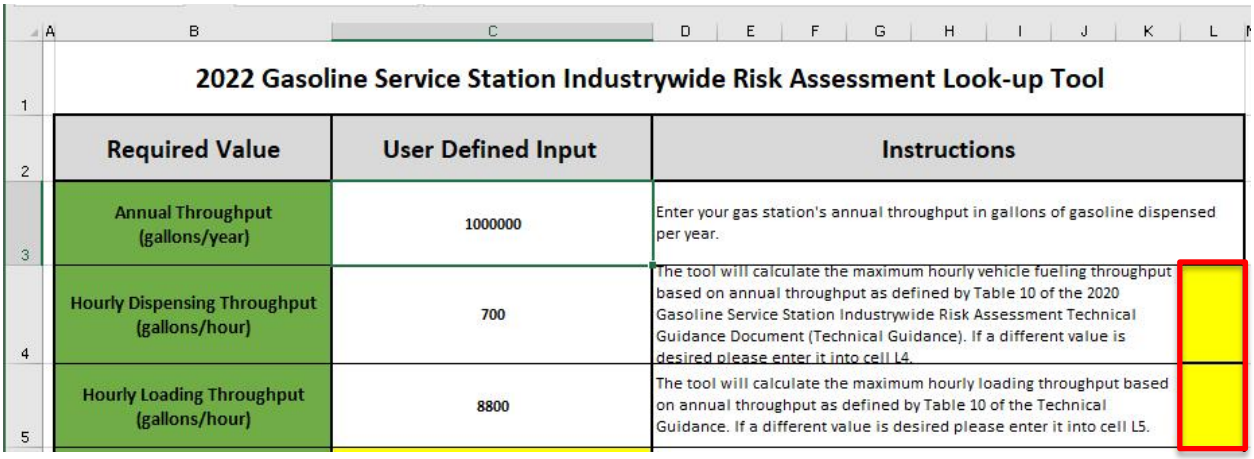
Required Value	User Defined Input	Instructions
Annual Throughput (gallons/year)		Enter your gas station's annual throughput in gallons of gasoline dispensed per year.
Hourly Dispensing Throughput (gallons/hour)		The tool will calculate the maximum hourly vehicle fueling throughput based on annual throughput as defined by Table 10 of the 2020 Gasoline Service Station Industrywide Risk Assessment Technical Guidance Document (Technical Guidance). If a different value is desired please enter it into cell L4.
Hourly Loading Throughput (gallons/hour)		The tool will calculate the maximum hourly loading throughput based on annual throughput as defined by Table 10 of the Technical Guidance. If a different value is desired please enter it into cell L5.

To generate risk results in the Look-up Tool, the first step is specifying gasoline throughput (gasoline dispensed). The *annual throughput* is needed to calculate cancer risk and the chronic hazard index (HI). *Hourly dispensing throughput* and *hourly loading throughput* values are needed to calculate acute HI. Enter the *annual throughput* in gallons per year (gallons/year) into the cell outlined in red in the *Figure 2* above. This will then automatically populate the two input cells below it based on

recommended values from the Technical Guidance. All three cells should now be white and have a numerical value in them, as shown in *Figure 3* on the next page.

Based on the gas station being evaluated, the user may want to use values that differ from the recommended values in the Technical Guidance. This can be done by entering site-specific values in the yellow cells outlined in red in *Figure 3*. These values must be approved by the District prior to use. Results of the user inputs with user-specified values are shown in *Figure 4*.

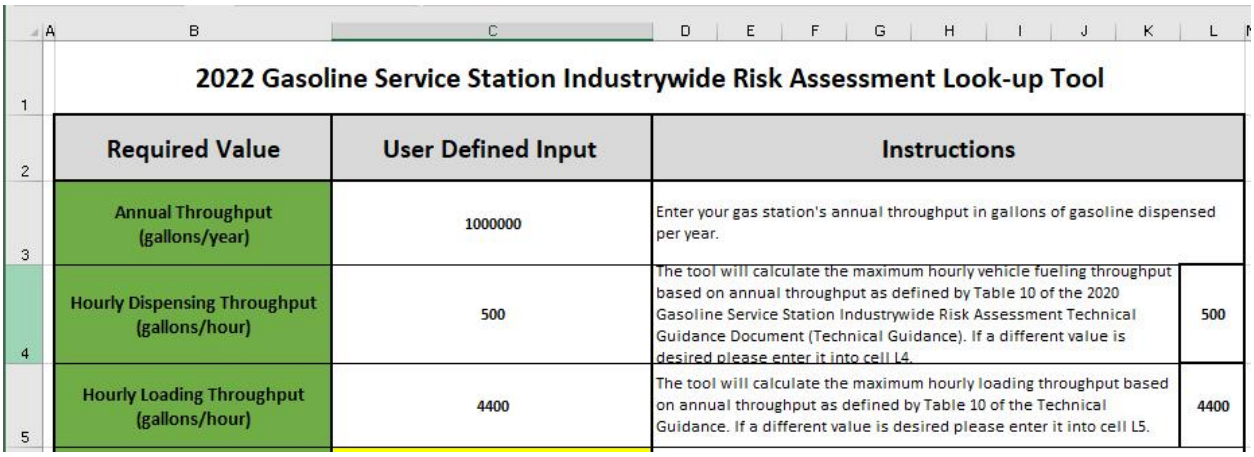
Figure 3 - Throughput Inputs Filled In



2022 Gasoline Service Station Industrywide Risk Assessment Look-up Tool

Required Value	User Defined Input	Instructions
Annual Throughput (gallons/year)	1000000	Enter your gas station's annual throughput in gallons of gasoline dispensed per year.
Hourly Dispensing Throughput (gallons/hour)	700	The tool will calculate the maximum hourly vehicle fueling throughput based on annual throughput as defined by Table 10 of the 2020 Gasoline Service Station Industrywide Risk Assessment Technical Guidance Document (Technical Guidance). If a different value is desired please enter it into cell L4.
Hourly Loading Throughput (gallons/hour)	8800	The tool will calculate the maximum hourly loading throughput based on annual throughput as defined by Table 10 of the Technical Guidance. If a different value is desired please enter it into cell L5.

Figure 4 - Throughputs with User Override



2022 Gasoline Service Station Industrywide Risk Assessment Look-up Tool

Required Value	User Defined Input	Instructions	
Annual Throughput (gallons/year)	1000000	Enter your gas station's annual throughput in gallons of gasoline dispensed per year.	
Hourly Dispensing Throughput (gallons/hour)	500	The tool will calculate the maximum hourly vehicle fueling throughput based on annual throughput as defined by Table 10 of the 2020 Gasoline Service Station Industrywide Risk Assessment Technical Guidance Document (Technical Guidance). If a different value is desired please enter it into cell L4.	500
Hourly Loading Throughput (gallons/hour)	4400	The tool will calculate the maximum hourly loading throughput based on annual throughput as defined by Table 10 of the Technical Guidance. If a different value is desired please enter it into cell L5.	4400

D. Selecting Meteorological Data

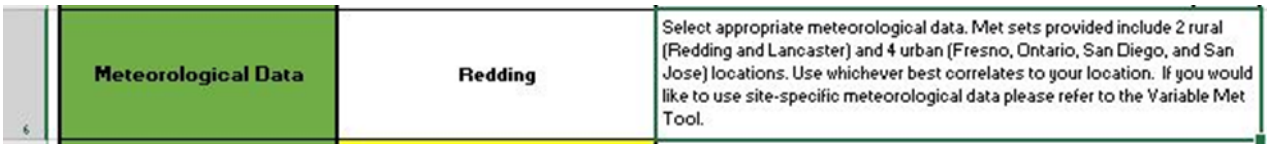
Next, the user needs to select a *meteorological data (met data) set*. The Technical Guidance generates risk results using six representative *met data sets* across the State. *Figure 5* shows the met data input in its unselected state. Clicking on the yellow input cell will bring up an option for the user to select the *met data set* from a drop down list. The button to enable the list is outlined in red in *Figure 5*. Clicking the button

brings up a list of all the *met data sets* available in the Technical Guidance. *Figure 6* shows the available met data sets that the user can select by clicking on one of the six options. Once selected, the name of the *met data set* will appear in the cell and the cell will be white. This is shown in *Figure 7*. The user may change the *met data set* at any time to obtain a different risk result.

Figure 5 - Meteorological Data Unselected

Figure 6 - Available Met Data

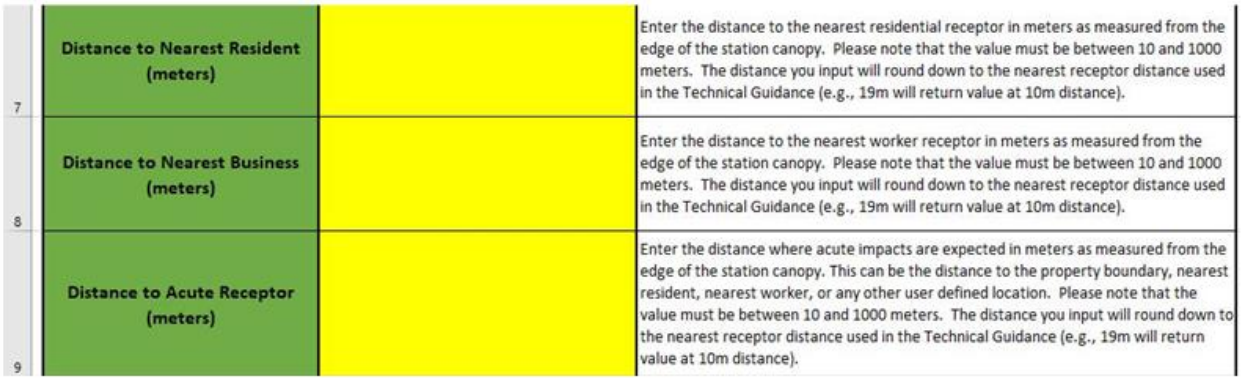
Figure 7 - Met Data Selected



E. Entering Receptor Distance

The Technical Guidance calculates risk at distances up to 1,000 meters from the gas station. The distances were measured from the edge of the gas station canopy (i.e. covered pump area). This tool requires the user to define receptor distances for three different types of risk calculations. *Figure 8* shows the three different distances needed for the Look-up Tool. All distances are in meters.

Figure 8 - Receptor Distances Unselected

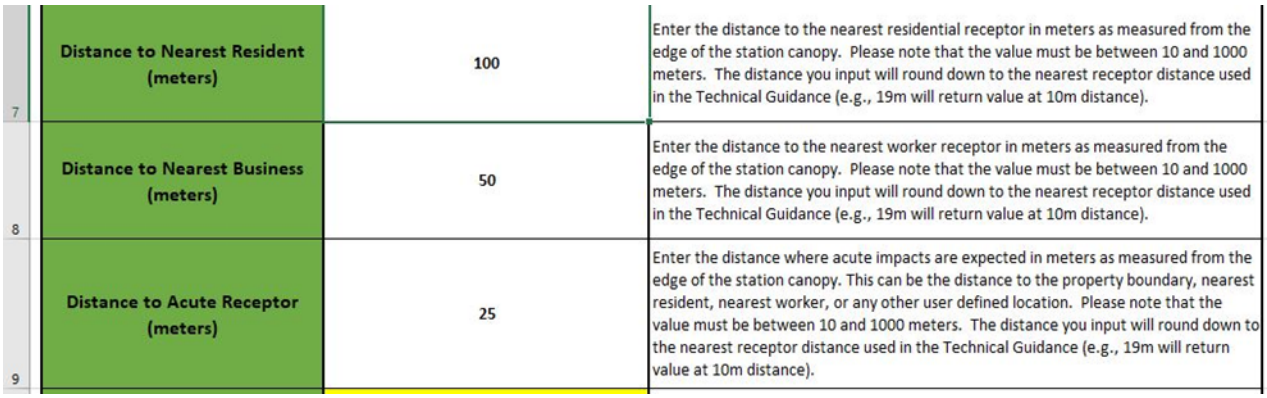


7	Distance to Nearest Resident (meters)		Enter the distance to the nearest residential receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
8	Distance to Nearest Business (meters)		Enter the distance to the nearest worker receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
9	Distance to Acute Receptor (meters)		Enter the distance where acute impacts are expected in meters as measured from the edge of the station canopy. This can be the distance to the property boundary, nearest resident, nearest worker, or any other user defined location. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).

The *Distance to Nearest Resident* refers to the distance from the edge of the canopy to the nearest residence. This input can also be used for any sensitive receptor of interest where the evaluation is being done for a non-worker receptor (e.g., patients at hospital, children at a daycare center or school). The *Distance to Nearest Business* refers to the distance between the gas station canopy and any offsite worker. This can include any employee that works at a co-located store or restaurant that is not the gas station minimart (e.g., fast food restaurant sharing the minimart building). The *Distance to Acute Receptor* is defined as the distance from the edge of the canopy to any location where the user may want to evaluate acute health impacts (e.g., gas station property line, nearest residence, nearest business, nearest sensitive receptor).

Please note that the distance used will round down to the nearest receptor distance used in the Technical Guidance. For example, if the user enters 19 meters the risk values displayed will be from the 10-meter receptor distance as calculated in the Technical Guidance and not the 20-meter receptor distance (see Technical Guidance for all receptor distances). *Figure 9* below shows the receptor distances with user defined inputs.

Figure 9 - Receptor Distance Selected



7	Distance to Nearest Resident (meters)	100	Enter the distance to the nearest residential receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
8	Distance to Nearest Business (meters)	50	Enter the distance to the nearest worker receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
9	Distance to Acute Receptor (meters)	25	Enter the distance where acute impacts are expected in meters as measured from the edge of the station canopy. This can be the distance to the property boundary, nearest resident, nearest worker, or any other user defined location. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).

F. Selecting Control Scenario

The control scenario chosen by the user dictates the emission factors used in the risk calculations. *Control Scenario* is selected from a drop-down box. The user can select seven options, ranging in control efficiency. Details for each control option can be found in the Technical Guidance. The most common scenario in California is EVR Phase I and EVR Phase II. The user should confirm the gas stations control scenario when performing the screening risk assessment. *Figure 10* below shows the control scenario input cell without user input. Clicking on the drop-down arrow outlined in red will bring up the selection list as shown in *Figure 11* on the next page. Clicking on any of the options in the box will select the option. The user can change this selection at any time. On the next page, *Figure 12* shows the control scenario after it has been selected by the user.

Figure 10 - Control Scenario Unselected

Figure 11 - Control Scenario List

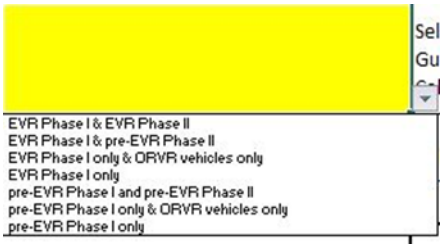
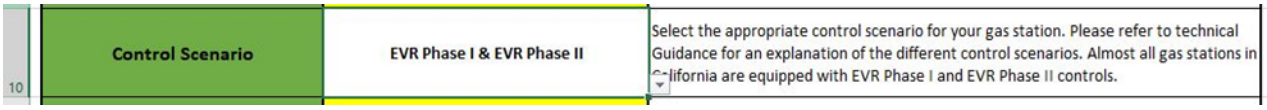


Figure 12 - Control Scenario Selected



G. Enabling Building Downwash

The final option that can be selected in the Look-up Tool is the building downwash adjustment. The building downwash can affect the dispersion of the gasoline vapors from the vent stack at the gas station. If any building is in close proximity to the vent stack, using building downwash may be appropriate. For the purposes of this Tool, close proximity is considered 5 times the longest dimension of the building. For example, if the gas station minimart is 5 meters long, 4 meters wide, and 4 meters tall and the vent stack is located 20 meters away from the building then building downwash should be considered because the vent stack is located within 25 meters (5 times the longest dimension of 5 meters, 5 * 5 = 25). The user should defer to the District regarding the use of building downwash as each District may have a unique policy on when the use of building downwash is appropriate. Including building

downwash in the analysis will increase the risk. See the Technical Guidance for more information on how building downwash adjustments were quantified and how it affects the risk.

Figure 13 below shows the un-populated building downwash input field without user input data. Like the control scenario and meteorological data selection, building downwash is also selected through a drop-down list. Clicking on the drop-down arrow outlined in the red box brings up a yes or no drop-down list as seen in *Figure 14* below. Selecting yes will include building downwash effects and selecting no will exclude building downwash. *Figure 15* below shows the populated building downwash field with the user-defined input.

Figure 13 - Building Downwash Unselected

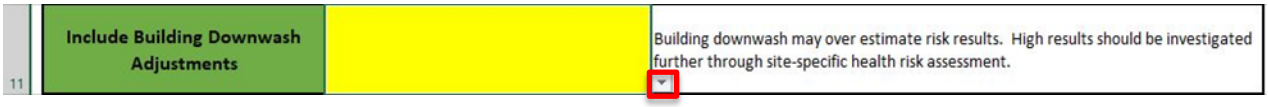


Figure 14 - Downwash Selection List

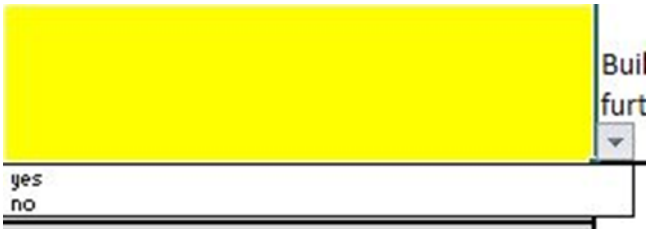
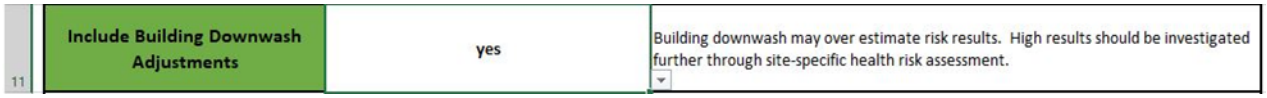


Figure 15 - Building Downwash Selected



H. Viewing and Printing Risk Results

After all user inputs have been entered, the Look-up Tool will automatically display risk results. *Figure 16* below shows the results cells in blue prior to completion of user inputs. In addition to the risk results, the Look-up Tool also displays the date and time of the last printing.

Figure 16 - Risk Results Incomplete

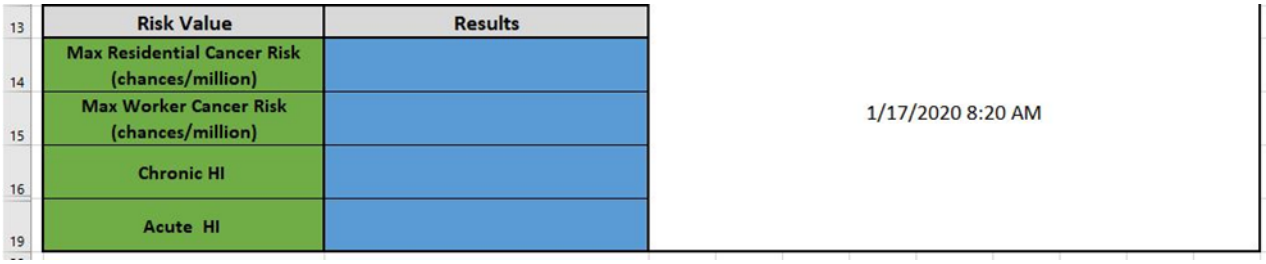
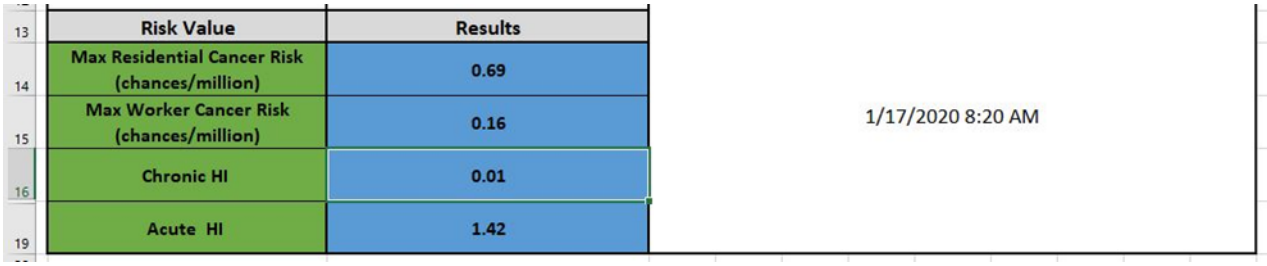


Figure 17 on the next page shows the results cells with generated risk results. The results are generated based off the user inputs and the cells remain blue in color. At this stage, the user may change any of the inputs and the risk values will update automatically.

Figure 17 - Risk Results Complete



Risk Value	Results
Max Residential Cancer Risk (chances/million)	0.69
Max Worker Cancer Risk (chances/million)	0.16
Chronic HI	0.01
Acute HI	1.42

1/17/2020 8:20 AM

To print the results, simply click the **Print** button shown in *Figure 18* below. This will use the default printer settings to print the page including all user inputs and risk results. This will also update the date and time. On the next page, *Figure 19* shows the final print out for the Look-up Tool.

Figure 18 - Print Button

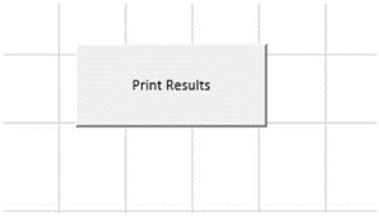


Figure 19 - Final Print Out

2020 Gasoline Service Station Industrywide Risk Assessment Look-up Tool

Required Value	User Defined Input	Instructions
Annual Throughput (gallons/year)	1000000	Enter your gas station's annual throughput in gallons of gasoline dispensed per year.
Hourly Dispensing Throughput (gallons/hour)	500	The tool will calculate the maximum hourly vehicle fueling throughput based on annual throughput as defined by Table 10 of the 2020 Gasoline Service Station Industrywide Risk Assessment Technical Guidance Document (Technical Guidance). If a different value is desired please enter it into cell L4. 500
Hourly Loading Throughput (gallons/hour)	4400	The tool will calculate the maximum hourly loading throughput based on annual throughput as defined by Table 10 of the Technical Guidance. If a different value is desired please enter it into cell L5. 4400
Meteorological Data	Redding	Select appropriate meteorological data. Met sets provided include 2 rural (Redding and Lancaster) and 4 urban (Fresno, Ontario, San Diego, and San Jose) locations. Use whichever best correlates to your location. If you would like to use site-specific meteorological data please refer to the Variable Met Tool.
Distance to Nearest Resident (meters)	100	Enter the distance to the nearest residential receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Distance to Nearest Business (meters)	50	Enter the distance to the nearest worker receptor in meters as measured from the edge of the station canopy. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Distance to Acute Receptor (meters)	25	Enter the distance where acute impacts are expected in meters as measured from the edge of the station canopy. This can be the distance to the property boundary, nearest resident, nearest worker, or any other user defined location. Please note that the value must be between 10 and 1000 meters. The distance you input will round down to the nearest receptor distance used in the Technical Guidance (e.g., 19m will return value at 10m distance).
Control Scenario	EVR Phase I & EVR Phase II	Select the appropriate control scenario for your gas station. Please refer to technical Guidance for an explanation of the different control scenarios. Almost all gas stations in California are equipped with EVR Phase I and EVR Phase II controls.
Include Building Downwash Adjustments	yes	Building downwash may over estimate risk results. High results should be investigated further through site-specific health risk assessment.
Risk Value	Results	
Max Residential Cancer Risk (chances/million)	0.69	
Max Worker Cancer Risk (chances/million)	0.16	4/29/2020 11:08 AM
Chronic HI	0.01	
Acute HI	1.42	

III. Variable Meteorology Tool

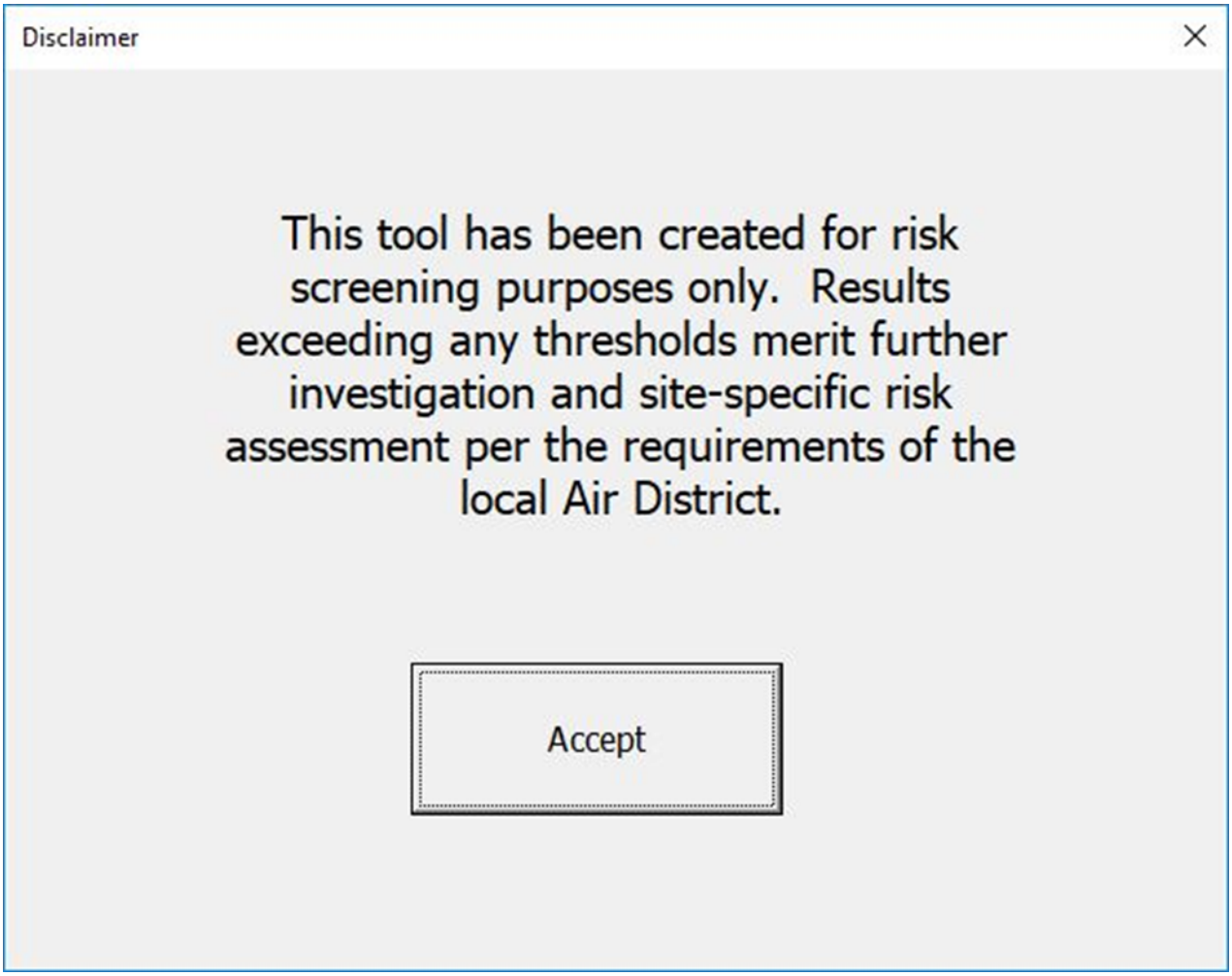
A. Downloading the Variable Meteorology Tool

To download the Variable Meteorology Tool please visit *Gasoline Service Station Industrywide Risk Assessment Guidance | California Air Resources Board*.

B. Opening the Variable Meteorology Tool

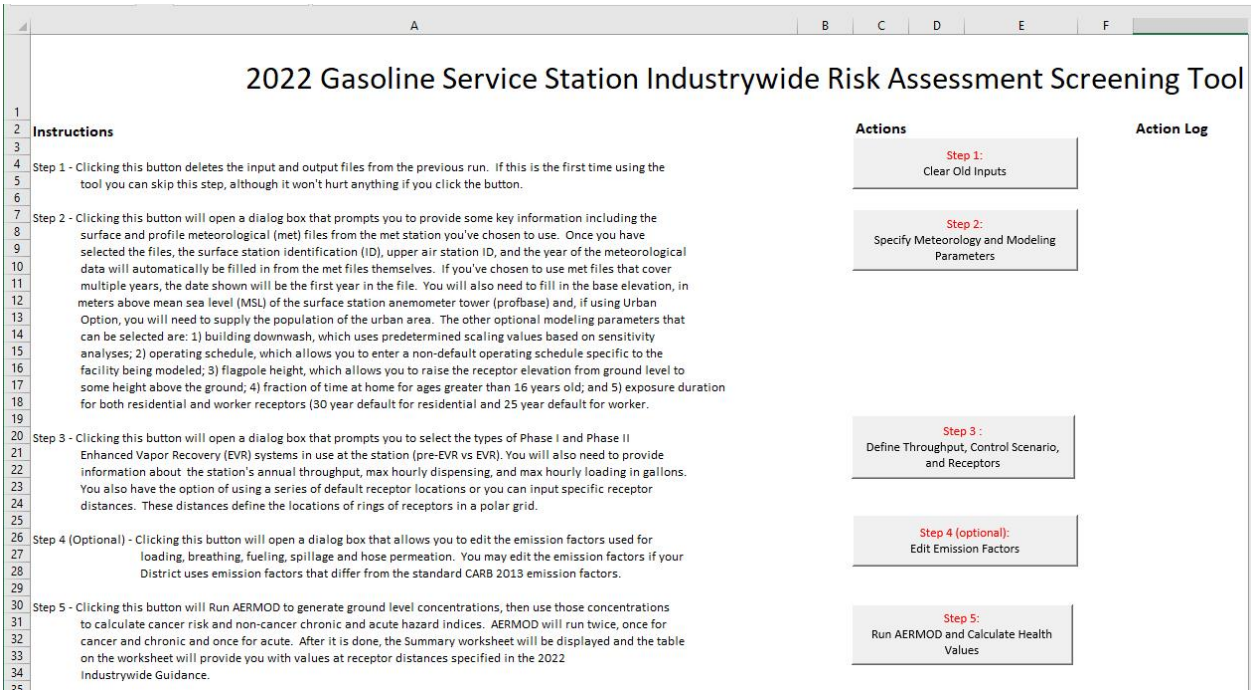
Select the Variable-Met Tool.xlsm file from the downloaded folder in *Section III.A*. The file will open an excel worksheet that functions as the input and output for the tool. A splash screen will appear upon opening.

Figure 20 - Splash Screen



Clicking the **Accept** button will acknowledge the disclaimer stated in the splash screen. Once the splash screen has been accepted, the tool will open to the screen shown in *Figure 21* on the next page.

Figure 21 - Front End View

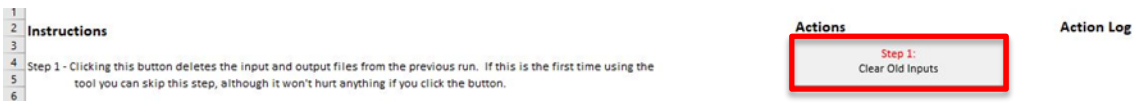


The screen has three columns: column A contains the instructions, which provide a brief summary of each step of the process, column B has the action buttons, which operate each step of the process, and column C has an action log, that records when each step has been completed. At this point, we recommend that the tool be "saved-as" with a unique identifier such as met set location in the title.

C. Step 1 - Clearing Old Inputs

The first step in running the tool is to clear all existing AERMOD files from previous uses of the tool. The tool will automatically overwrite existing files, but there are situations where not all files are used. In those cases, having existing data, from prior modeling runs in the folder, may create confusion. We recommend that no other AERMOD-related files be stored in the folder containing this tool because they may be deleted unintentionally. The files deleted by the tool in this step have the following extensions: .inp, .out, .PLT, .TMP, and .LST. Any file with one of those extensions in the same folder as the tool will be deleted. *Figure 22* below shows the instructions, action button, and unfilled action log for Step 1 of the process.

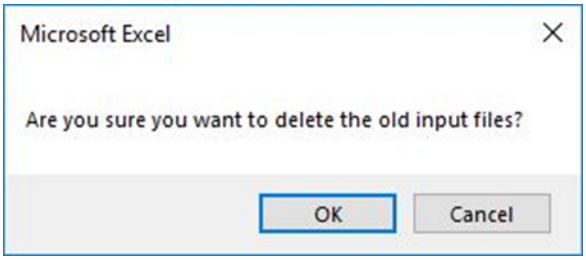
Figure 22 - Step 1



Clicking the action button outlined in red in the figure above initiates the process. Once clicked, the user will be prompted to confirm the action. *Figure 23* shows the

confirmation screen. Clicking **OK** carries out the deletion of old files while clicking **Cancel** voids the action.

Figure 23 - Confirm Action



Once the user has deleted the old input files, the action cannot be undone, and a new AERMOD dispersion run will be required. Once the old files have been deleted, the user will be notified via a message box shown in *Figure 24* below. Clicking the **OK** button in the message box acknowledges the action and allows the user to move on to the next step in the process. After completing this step, the action log will note the time and date of completion.

Figure 24 - Action Complete

Figure 25 below shows the final view with the populated action log. This step may be performed at any time during the process, but if any new input files have been created or dispersion modeling performed, all steps will need to be repeated.

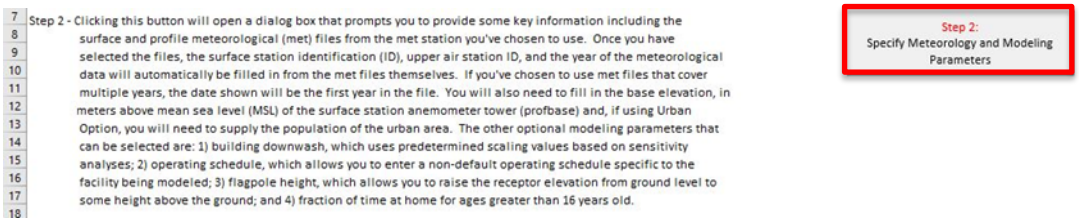
Figure 25 - Step 1 Complete

D. Step 2 - Specifying Meteorology and Modeling Parameters

Step 2 consists of specifying the met data and other modeling parameters for the air dispersion modeling in this tool. These parameters cannot be changed without requiring a new modeling run. Step 2 also allows the user to change a few parameters that do not affect the modeling (i.e., fraction of time at home, building downwash, and exposure duration). These parameters can be changed in Step 2 or modified after the

modeling run is complete. *Figure 26* below shows Step 2 with an incomplete action log. Clicking on the button outlined in red initiates the step.

Figure 26 - Step 2



1. Selecting the surface and profile meteorological files

When clicking the Step 2 action button a data input window will appear. *Figure 27* below shows the data window before any user data is specified. Specifying met data is done by clicking on the **Select Surface File** button outlined in red. This opens a file selection window and the user should navigate to the location of the surface file on their computer.

Figure 27 - Input Screen

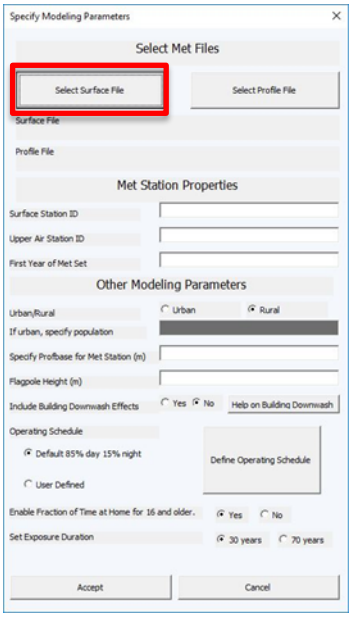
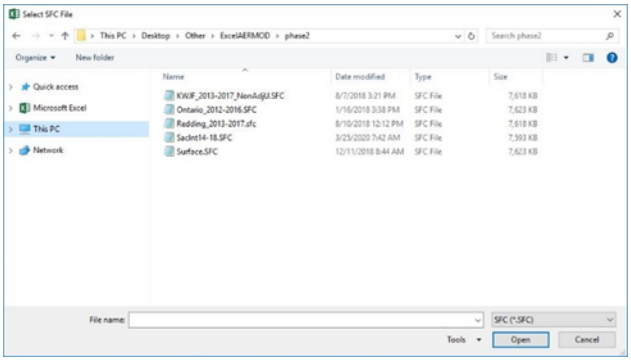


Figure 28 on the next page shows the file selection screen. The user is limited to selecting the surface (.SFC) portion of the AERMOD-ready met files.

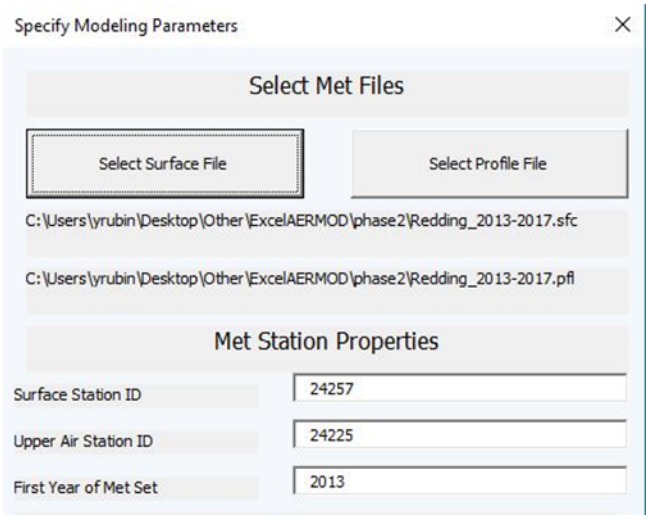
Figure 28 - Surface File Selection Screen



Once the surface file is selected, its location will be noted on the input screen. Additionally, if the profile file (.PFL extension) is in the same location and has the same naming convention as the surface file, it will also be selected and noted in the input screen. If the profile file has a different naming convention than the surface file, the user must manually select the profile file. It can be selected by clicking the **Select Profile File** button and navigating to the location of the file. Double check that the selected files met file paths are correct before proceeding.

Selecting the met files will also auto populate the *Met Station Properties* section of the input window. The *Surface Station ID*, *Upper Air Station ID*, and *First Year of Met Set* are automatically read from the surface met file. These values are required to proceed and the user should check to make sure they are populated. *Figure 29* below shows the selected surface and profile files as well as populated met station properties.

Figure 29 - Met Files Selected



2. Urban/Rural and Profbase for Met Set

The user must specify two other required met properties: the *dispersion coefficient* (i.e., Urban/Rural) and the met set's *profbase* (i.e., elevation of the met station). *Figure 30*, *Figure 31*, and *Figure 32* below show where these parameters should be entered.

Urban/Rural refers to the land cover data surrounding the met station. The user should follow District guidelines on when to use the rural or urban option. If using the urban option the user needs to specify the population of the urban area. The Technical Guidance assumes a default value of 100,000, but the user may use a value that is specific to the area in which the gas station operates. This value must be approved by the District. The *profbase* is defined as the base elevation for the main met tower of the met set and should be a known property for the met set. *Profbase* value can generally be found with the source providing met data.

Figure 30 - Rural/No Profbase

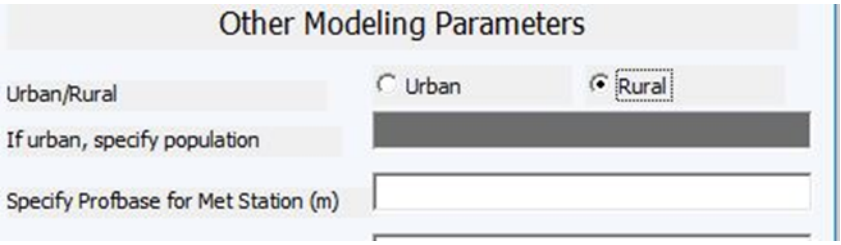


Figure 31 - Rural/Specified Profbase

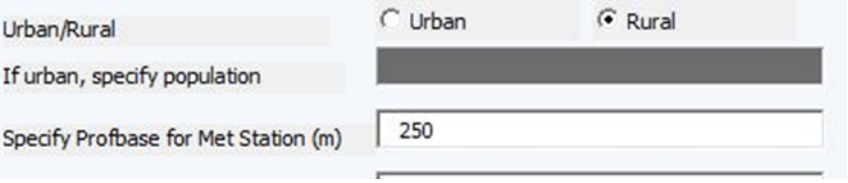
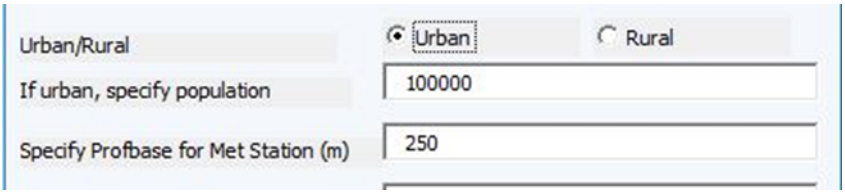


Figure 32 - Urban/Specified Profbase

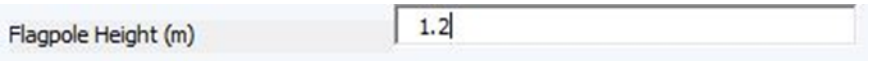


3. Specifying Flagpole Height

The *flagpole height* is the height at which the model calculates the concentrations and risk values. The Technical Guidance assumes a *flagpole height* of 1.2 meters, which is commonly used in modeling. Some Districts use different values for *flagpole height* and the user should confirm which value to use with their District. *Figure 33* and *Figure 34* on the next page show the *flagpole height* parameter with and without data entry.

Figure 33 - Flagpole Unfilled

Figure 34 - Flagpole Specified



4. Specifying Building Downwash

Building downwash is important to consider when calculating risk. Consult the Technical Guidance for more information regarding *building downwash*. Whether or not *building downwash* is applicable depends on the site-specific layout of the gas station. This feature can be turned on or off after the modeling has been completed. Users should consult District policy in order to determine whether to include *building downwash*. The tool also provides a utility to help the user determine whether including *building downwash* is recommended by the Technical Guidance. *Figure 35* below shows the *building downwash* in its disabled state. In order to enable it, simply click the radio button highlighted in red. In order to access the help utility, click on the button highlighted in green.

Figure 35 - Downwash Disabled

Opening the help utility will allow the user to input their *site-specific building dimensions* and check to see if the distance of the pressure/vacuum valve (PV valve) from the building justifies the inclusion of building downwash. *Figure 36* below shows the help utility. The user should enter their *building dimensions* and *PV valve distance* in the cells outlined in red. The button outlined in green will check and provide a result.

Figure 36 - Help Utility

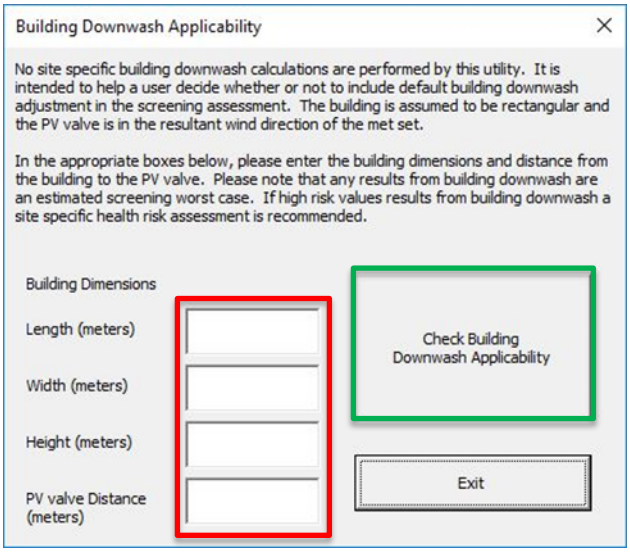
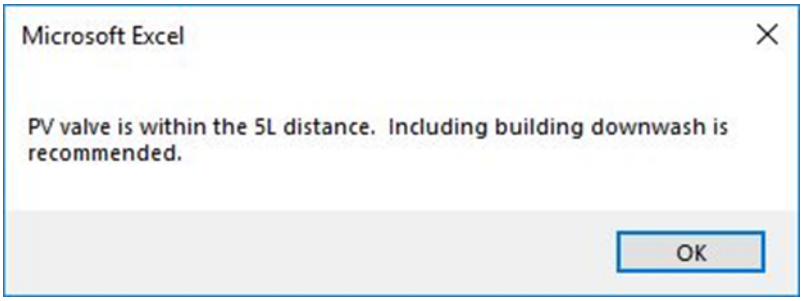


Figure 37 below shows the results of the check. After performing the check, the user should use the **Exit** button to return to the main meteorology and modeling parameters utility.

Figure 37 - Downwash Recommendations



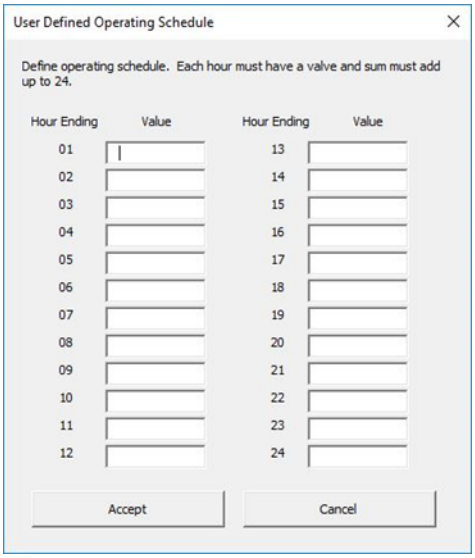
5. Specifying Operating Schedule

The Technical Guidance defines an 85% day 15% night *operating schedule* as the default for gas stations operating in California. If a gas station operates on a different schedule, users should obtain the approval from the District prior to using the new operating schedule in the tool. *Figure 38* below shows the *operating schedule* set to the default 85% day 15% night.

Figure 38 - Operating Schedule Default

In order to change the *operating schedule*, the user must first click the **User Defined** radio button, outlined in red, and then click the **Define Operating Schedule** button, outlined in green. This will launch the operating schedule utility shown in *Figure 39* on the next page. In this utility, each field must have a user-defined value. Each value represents a fraction of 24 hours and therefore the total sum of all must equal to 24. In order to turn off operation in any specific hour, the user should enter a value of zero. For example, if the user wants to evaluate a gas station that only operates between the hours of 6 AM and 6 PM, a value of two must be entered for each hour starting with hour ending 07 though hour ending 19, with zeros for all other hours.

Figure 39 - Define Schedule



6. Specifying Fraction of Time at Home and Exposure Duration.

The last options that users can modify through the meteorology and modeling parameter selection utility are *Fraction of Time at Home* and *Exposure Duration*. These options affect the risk calculations and can be modified after the AERMOD model has been completed. The user may choose to use the *fraction of time at home* adjustment, 30-year or a 70-year exposure duration for residential cancer risk, and 25-year or 40-year exposure duration for worker cancer risk. The Technical Guidance uses *fraction of time at home*, 30-year residential exposure duration and 25-year worker exposure duration as the default. District policy may or may not require the *fraction of*

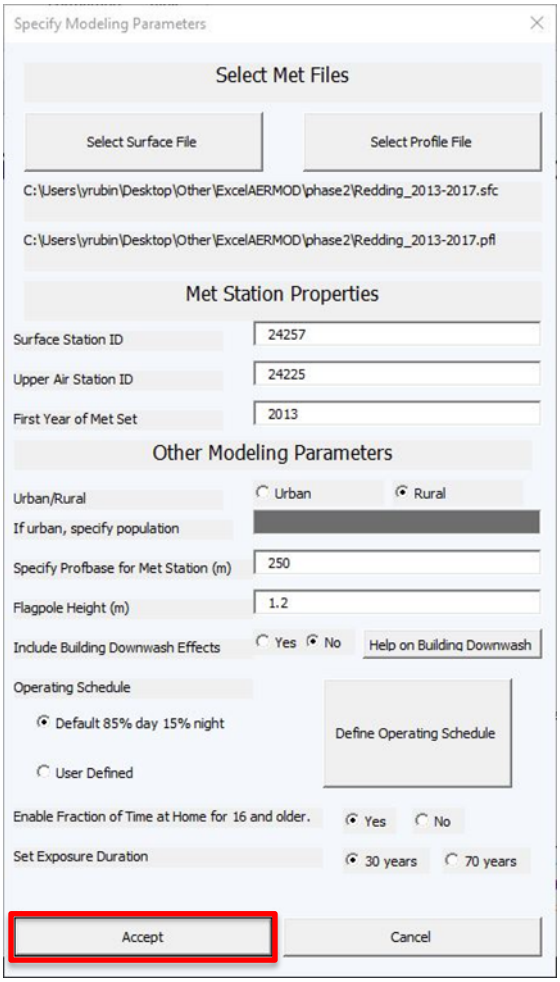
time at home adjustment and a specific *exposure duration*; therefore, the user should consult with the District. *Figure 40***Error! Not a valid bookmark self-reference.**below shows the *fraction of time at home* adjustment and *exposure duration* options. Simply click the corresponding radio buttons for the desired options.

Figure 40 – Fraction of Time at Home Adjustment and Exposure Duration Options

7. Completing the Step

After the data in Steps 1 through 6 has been entered, the user must hit the **Accept** button at the bottom of the utility window. This will insert all the user inputs into the model, exit out of the utility to the Tool's front-end screen, and update the action log to reflect the time the input was completed. *Figure 41* below shows the button outlined in red. Clicking the **Cancel** button will exit out of the tool without saving any information.

Figure 41 - Modeling Parameters Completed



E. Step 3 - Define Throughput, Control Scenario, and Receptors

Step 3 specifies gas station control equipment, throughput, and the location of receptors. Control equipment and throughput can be modified after the modeling is complete, while changes to receptor location require a new modeling run. *Figure 42* on the next page shows partial instructions for Step 3, the action button to launch Step 3 outlined in red, and a blank action log. Clicking the button outlined in red launches the Step 3 utility shown in *Figure 43*.

Figure 42 - Step 3

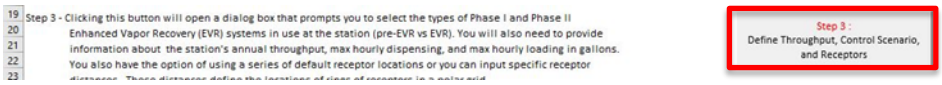
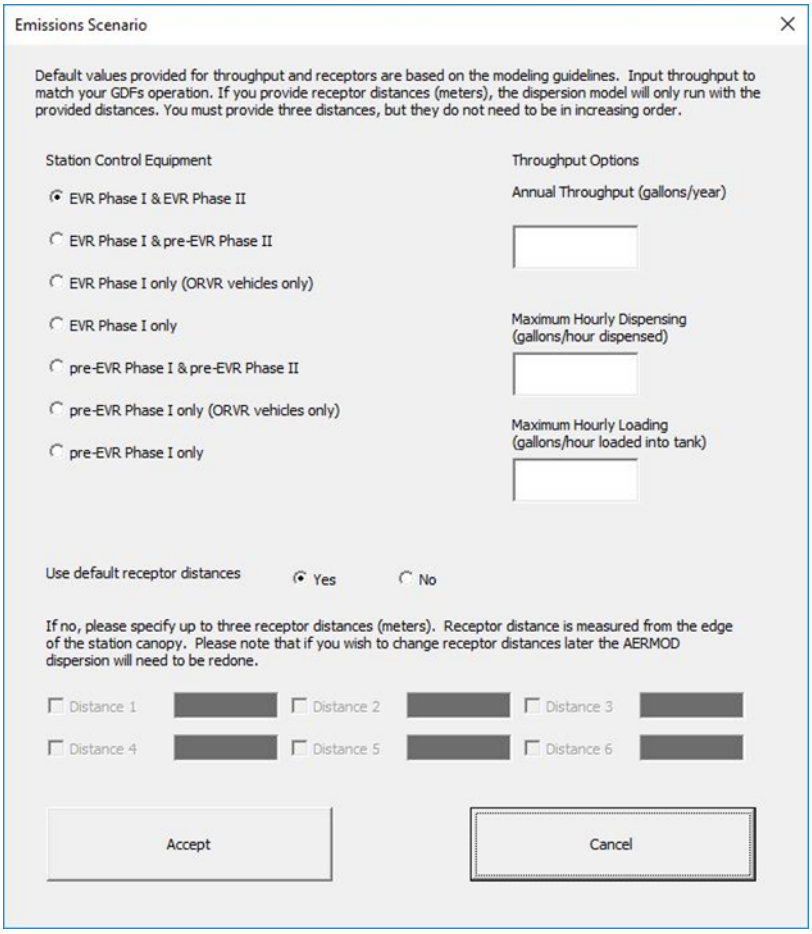


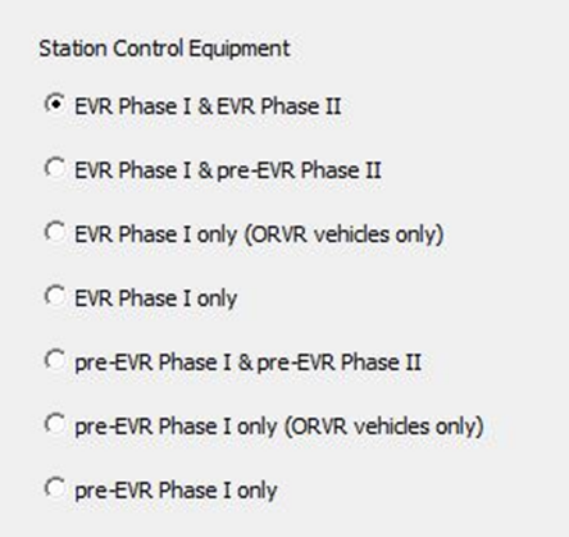
Figure 43 - Step 3 Utility



1. Station Control Scenario

Gas stations have different levels of controls as prescribed by CARB and District requirements. The vast majority of gas stations in California use EVR Phase I and EVR Phase II controls. If the user is performing a screening assessment on a gas station that has some other combination of controls, the user may select the proper configuration from the listed control options. On the next page, *Figure 44* shows the possible control equipment options that are selectable. The user must confirm the control options with the District to confirm the proper control scenario for the gas station.

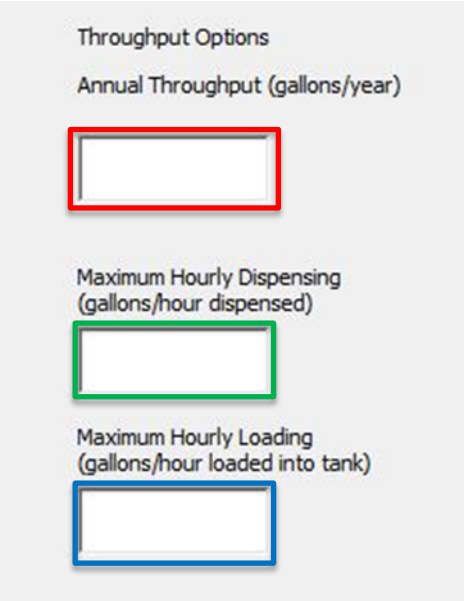
Figure 44 - Control Equipment



2. Station Gasoline Throughput

Users must specify gas station throughput values in order for risk results to be calculated. *Figure 45* below shows the throughput entry boxes.

Figure 45 - Throughput



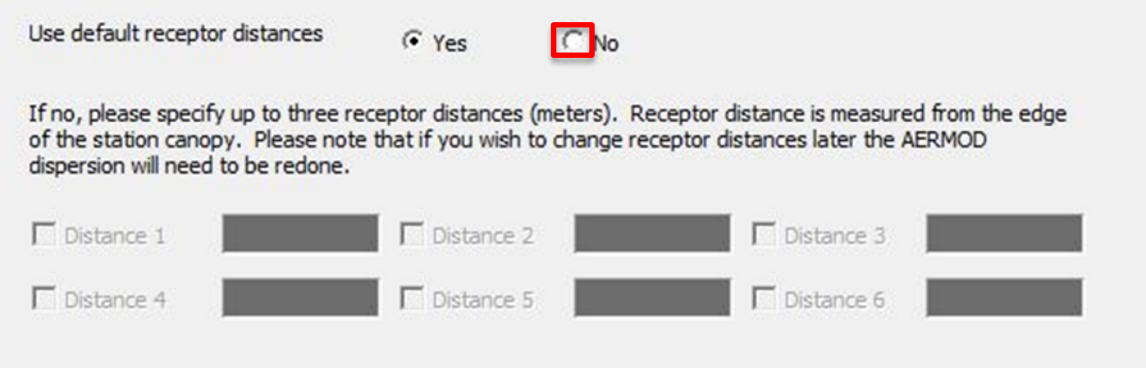
Three separate throughput values are required for the risk calculations and all values should be entered without commas. For example, 3 million gallons per year should be entered as 3000000. *Annual throughput* for the gas station should be provided in gallons per year and entered into the box highlighted in red. *Hourly dispensing throughput* should be provided in gallons per hour and entered into the box outlined in green. This is the maximum amount the station could dispense in any one hour of

operation. *Maximum hourly loading* should be provided in gallons per hour and entered into the box outlined in blue. This refers to the amount of fuel that can be delivered to the gas station in any one hour. The user should enter site-specific throughput values. If the user cannot provide site-specific hourly maximum values, the user should use recommended values from the Technical Guidance or from their District.

3. Receptor Locations

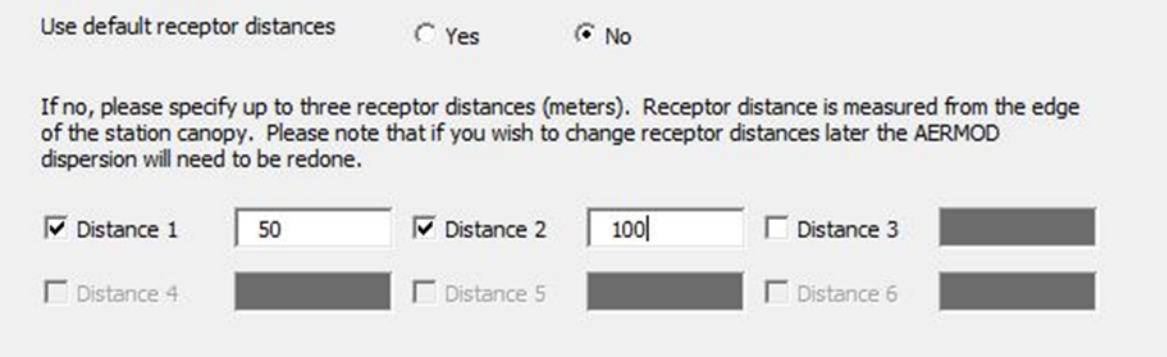
By default, the Tool uses the receptor locations specified in the Technical Guidance. The user has the option to change the receptor locations and can specify up to six user-defined receptor distances to replace the default distances. *Figure 46* below shows default receptor locations selected. In order to use user-defined distances the user must first select the radio button labeled **No**, outlined in red, in response to "Use default receptor distances".

Figure 46 - Receptor Distance



Once the **No** button has been selected, the check box next to *Distance 1* will become active. The user must select this checkbox in order to specify the actual receptor distance. After *Distance 1* is specified, the checkbox for *Distance 2* becomes active. Selecting that checkbox will allow the user to input *Distance 2*. The user may repeat this process until up to six distances have been specified. *Figure 47* below shows two user defined receptors.

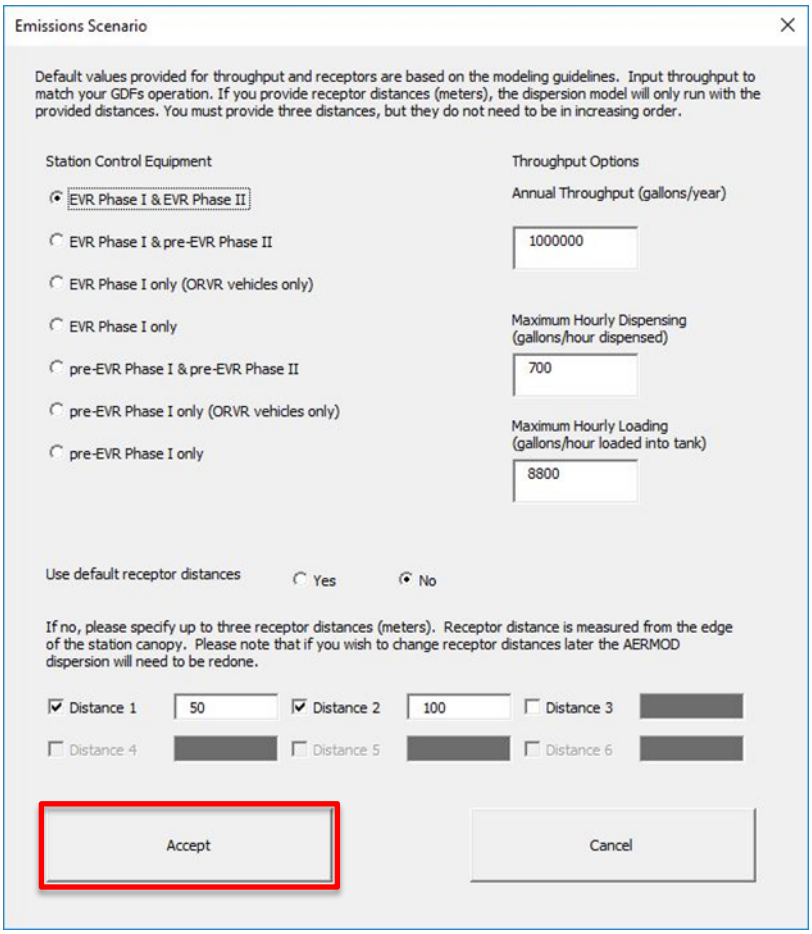
Figure 47 - User Defined Receptors



4. Completing the Step

After the user has entered data in Steps 1 through 3, the user must select the **Accept** button at the bottom of the utility window. This will insert all the user inputs into the model, exit out of the utility to the Tool's front-end screen, and update the action log to reflect the time the input was completed. *Figure 48* below**Error! Not a valid bookmark self-reference.** shows the button outlined in red. Clicking the **Cancel** button will exit out of the tool without saving any information.

Figure 48 - Step 3 Completed



F. Step 4 - Define Emission Factors

Step 4 of the process is to define the *emission factors* used to calculate gas station emissions. By default, the *emission factors* from the Technical Guidance are used in this tool. Please refer to Section II of the Health Risk Assessment of the Technical Guidance for more information regarding *emission factors*. *Figure 49* on the next page shows partial instructions for Step 4, the action button to launch Step 4 outlined in red, and a blank action log. Clicking the button outlined in red launches the Step 4 utility shown in *Figure 50* on the next page.

Figure 49 - Step 4

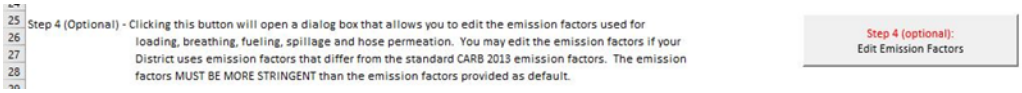


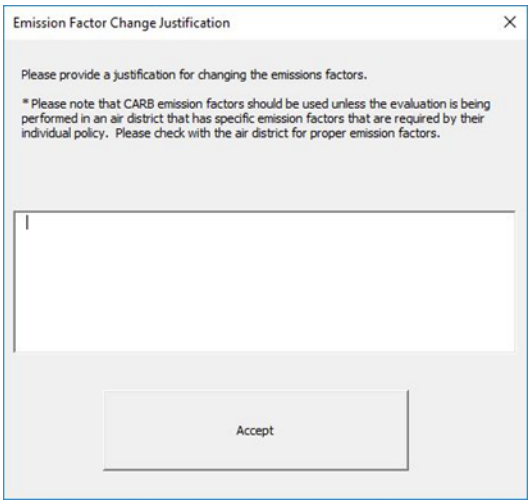
Figure 50 - Edit Emission Factors

The default *emission factors* used in the tool are the CARB 2013 *emission factors*. The user should consult the District to confirm which *emission factors* to use. To change the *emission factors* for any control scenario the user must click into any cell they want to modify, delete the default value, and input their own emission factor. Clicking the **Reset** button, outlined in red, will restore default emission factors. Clicking the **Accept** button, outlined in green, will save all emission factors.

If the *emission factors* have been modified, the user will receive a prompt to provide justification for the use of non-default *emission factors*. *Figure 51* on the next page shows the justification window. Clicking the **Close** button will exit the utility without saving any changes. Once *emission factors* have been updated through this utility and the tool has been saved, the last accepted *emission factors* will be used every time the tool is run. If the tool is being used exclusively for an area where non-default *emission*

factors are used, the base version of the tool should be saved with updated *emission factors*.

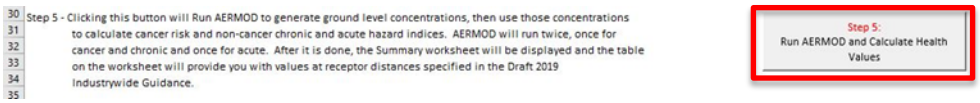
Figure 51 - Justification



G. Step 5 - Run AERMOD

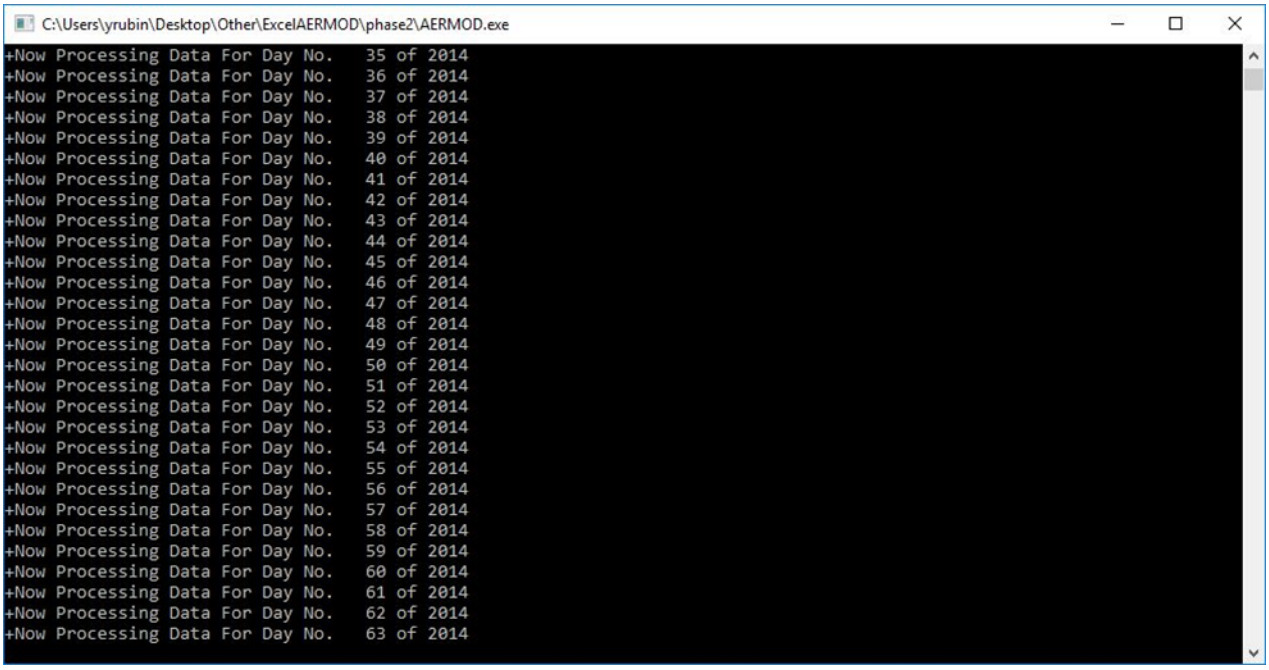
Step 5 of the process is to run AERMOD. *Figure 52* below shows partial instructions for Step 5, the action button to launch Step 5, outlined in red, and a blank action log. Clicking the button outlined in red launches Step 5.

Figure 52 - Step 5



Once running, the user will see the AERMOD progress window shown in *Figure 53* on the next page. Once the AERMOD run is completed, the user will be redirected to the results summary.

Figure 53 - Example of AERMOD Run



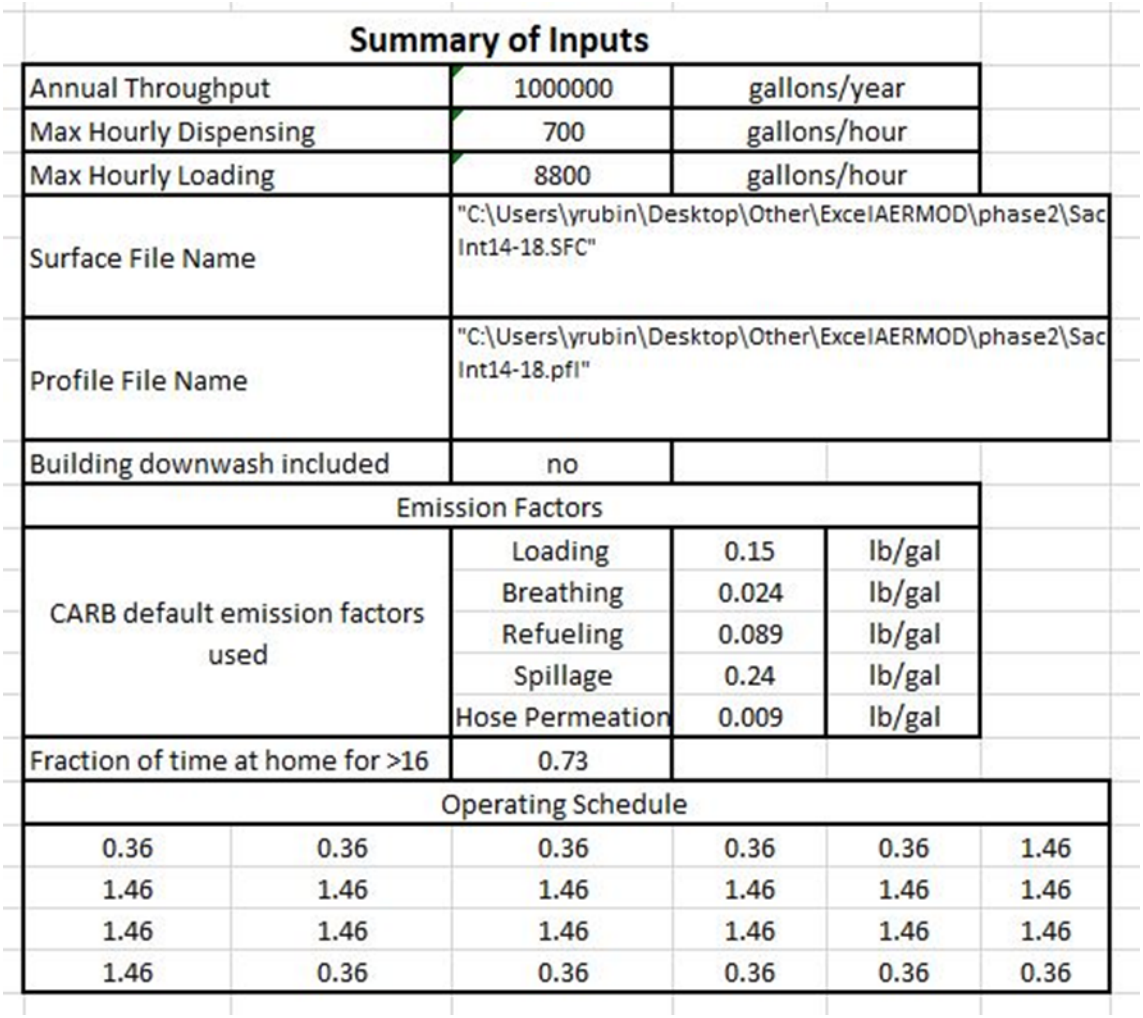
H. Summary of Results

After running AERMOD, the user is automatically redirected to the summary page. From this summary page, the user can see risk results at all selected receptors, a summary of all inputs, and make changes to inputs that do not affect modeling. *Figure 54* shows the risk results, *Figure 55* shows the summary of inputs, and *Figure 56* shows the action buttons available through the summary screen.

Figure 54 - Risk Results

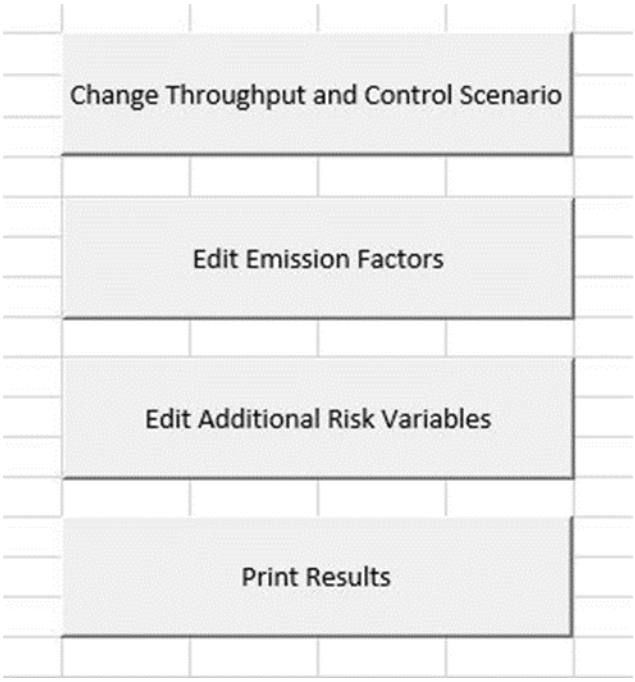
EVR Phase I & EVR Phase II				
Receptor Distance	Cancer Risk (chances/million)		Chronic	Acute
	Resident	Worker	HI	HI
10	6.2	0.5	0.0	0.5
20	3.5	0.3	0.0	0.4
30	2.3	0.2	0.0	0.3
40	1.6	0.1	0.0	0.2
50	1.1	0.1	0.0	0.2
60	0.9	0.1	0.0	0.1
70	0.7	0.1	0.0	0.1
80	0.6	0.0	0.0	0.1
90	0.5	0.0	0.0	0.1
100	0.4	0.0	0.0	0.1
120	0.3	0.0	0.0	0.0
140	0.2	0.0	0.0	0.0
160	0.2	0.0	0.0	0.0
180	0.1	0.0	0.0	0.0
200	0.1	0.0	0.0	0.0
220	0.1	0.0	0.0	0.0
240	0.1	0.0	0.0	0.0
260	0.1	0.0	0.0	0.0
280	0.1	0.0	0.0	0.0
300	0.1	0.0	0.0	0.0
350	0.0	0.0	0.0	0.0
400	0.0	0.0	0.0	0.0
450	0.0	0.0	0.0	0.0
500	0.0	0.0	0.0	0.0
600	0.0	0.0	0.0	0.0
700	0.0	0.0	0.0	0.0
800	0.0	0.0	0.0	0.0
900	0.0	0.0	0.0	0.0
1000	0.0	0.0	0.0	0.0

Figure 55 - Input Summary



Summary of Inputs					
Annual Throughput	1000000	gallons/year			
Max Hourly Dispensing	700	gallons/hour			
Max Hourly Loading	8800	gallons/hour			
Surface File Name	"C:\Users\yrubin\Desktop\Other\ExcelAERMOD\phase2\SacInt14-18.SFC"				
Profile File Name	"C:\Users\yrubin\Desktop\Other\ExcelAERMOD\phase2\SacInt14-18.pfl"				
Building downwash included	no				
Emission Factors					
CARB default emission factors used	Loading	0.15	lb/gal		
	Breathing	0.024	lb/gal		
	Refueling	0.089	lb/gal		
	Spillage	0.24	lb/gal		
	Hose Permeation	0.009	lb/gal		
Fraction of time at home for >16	0.73				
Operating Schedule					
0.36	0.36	0.36	0.36	0.36	1.46
1.46	1.46	1.46	1.46	1.46	1.46
1.46	1.46	1.46	1.46	1.46	1.46
1.46	0.36	0.36	0.36	0.36	0.36

Figure 56 - Action Buttons



The action buttons provide the user some ability to modify the risk results without needing to rerun the model. A new model is only required if the user needs to change meteorological data, receptor locations, operating schedule, or flagpole height. Clicking the **Change Throughput and Control Scenario** button will allow the user to change throughput and control equipment settings. See *Section III.E.1* and *III.E.2* for guidance on changing these settings. Clicking the **Edit Emission Factors** button will allow the user to edit emission factors. See Section III.F for guidance on emission factors. Clicking the **Edit Additional Risk Variables** button will allow the user to change the settings for building downwash, fraction of time at home, and exposure duration. See *Section III.D.4* and *III.D.6*. Clicking **Print Results** button prints the results and input summary to the user's default printer.

I. Using the Tool as a Calculator

This tool may be used as a static calculator if the user wants to evaluate multiple gas stations using the same met data and receptor location. To do this the user should follow the steps outlined in *Section III.A* through *Section III.G*, then save the tool with a unique name. After this, the user can use the action buttons provided on the summary screen to change throughputs and other station specific options.