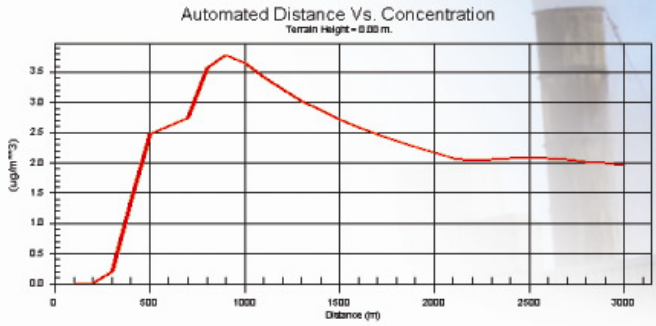
SCREEN View

Screening Air Dispersion Model (SCREEN3)



User's Guide

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Lakes Environmental

SCREEN View™

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Introduction

SCREEN Model

The SCREEN model was developed to provide an easy-to-use method of obtaining pollutant concentration estimates. These estimates are based on the document "Screening Procedures for Estimating The Air Quality Impact of Stationary Sources" (EPA 1995d).

SCREEN3, version 3.0 of the SCREEN model (latest release version 13043, released March 6, 2013), can perform all the single source short-term calculations in the EPA screening procedures document, including:

- Estimating maximum ground-level concentrations and the distance to the maximum.
- Incorporating the effects of building downwash on the maximum concentrations for both the near wake and far wake regions.
- Estimating concentrations in the cavity recirculation zone.
- Estimating concentrations due to inversion break-up and shoreline fumigation.
- Determining plume rise for flare releases.
- Incorporate the effects of simple elevated terrain on maximum concentrations.
- Estimate 24-hour average concentrations due to plume impaction in complex terrain using the VALLEY model 24-hour screening procedure.
- Model simple area sources using a numerical integration approach.
- Be used to model the effects of simple volume sources using a virtual point source procedure.
- Calculate the maximum concentration at any number of user-specified distances in flat or elevated simple terrain, including distances out to 100 km for long-range transport.
- Examine a full range of meteorological conditions, including all stability classes and wind speeds to find maximum impacts.
- Include the effects of buoyancy-induced dispersion (BID).
- Explicitly calculates the effects of multiple reflections of the plume off the elevated inversion and off the ground when calculating concentrations under limited mixing conditions.

EPA's SCREEN3 model will not be able to do the following:

- Explicitly determine maximum impacts from multiple sources, except for the procedure to handle multiple nearby stacks by merging emissions into a single "representative" stack. (See Merged Parameters for Multiple Stacks)

> With the exception of the 24-hour estimate for complex terrain impacts, the results from SCREEN are estimated maximum 1-hour concentrations.

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Merged Parameters for Multiple Stacks

Despite the U.S. EPA 3.0 model being a single-source screening tool, it can be used to model impacts from multiple sources in certain situations (refer to the document Screening Procedures for Estimating The Air Quality Impact of Stationary Sources (EPA 1995d)). Sources that emit the same pollutant from several stacks with similar parameters that are within about 100m of each other may be analyzed by treating all of the emissions as coming from a single representative stack. To determine the appropriate parameters to use for the "representative" stack, calculate the parameter M for each stack :

$$M = \frac{(h_s \cdot V \cdot T_x)}{Q}$$

where:

M = merged stack parameter which accounts for the relative influence of stack height, plume rise, and emission rate on concentrations

h_s = stack height [m]

V = (p /4) ds2 vs = stack gas volumetric flow rate (m3/s)

d_s = inside stack diameter [m]

v_s = stack gas exit velocity [m/s]

T_s = stack gas exit temperature [K]

Q = pollutant emission rate [g/s]

The stack that has the lowest value of M is used as a "representative" stack. The "representative" stack will have the following parameters :

- n emission rate [g/s] -> Q= Q1 + Q2 + ... + Qn (sum of the emissions from all stacks)
- n stack height [m] -> hs1 (stack height of the "representative" source)
- n stack gas volumetric flow rate [m3/s] -> V1 (stack gas volumetric flow rate from "representative" source)
- n stack gas exit temperature [K] -> Ts1 (stack gas exit temperature from "representative" source)

The parameters from dissimilar stacks should be merged with caution. Stacks should be located no more than 100m apart, and stack parameters should differ by no more than about 20%.

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About SCREEN View

SCREEN View - About

SCREEN View™ is a user friendly interface for the U.S. EPA screening model, SCREEN3, and contains many features to make your modeling experience as easy as possible. SCREEN View is a Microsoft® Windows®-based application and runs in 32-bit and 64-bit versions of Windows 10/8/7.

SCREEN View contains all the available options of the U.S. EPA model, in addition to the following:

- SCREEN View has an integrated modeling environment : intuitive data input, model execution, and full featured post-processing (XY plotting).
- For each source, the data is input in two windows, making it easy to have a complete view of all the information.
- You can easily change between Metric and Imperial units, at any time, by clicking the unit button located beside each entry field.
- The program checks valid ranges for all entry fields, which will save your time by preventing wrong entries.
- Before running your project, SCREEN View displays a report of all options selected along with a list of any missing information.
- The SCREEN3 output file can be displayed and printed after completing a successful run.
- Model results can be displayed in graphical format.
- Context-sensitive "Help that really helps" provides you with clear explanations for each option.

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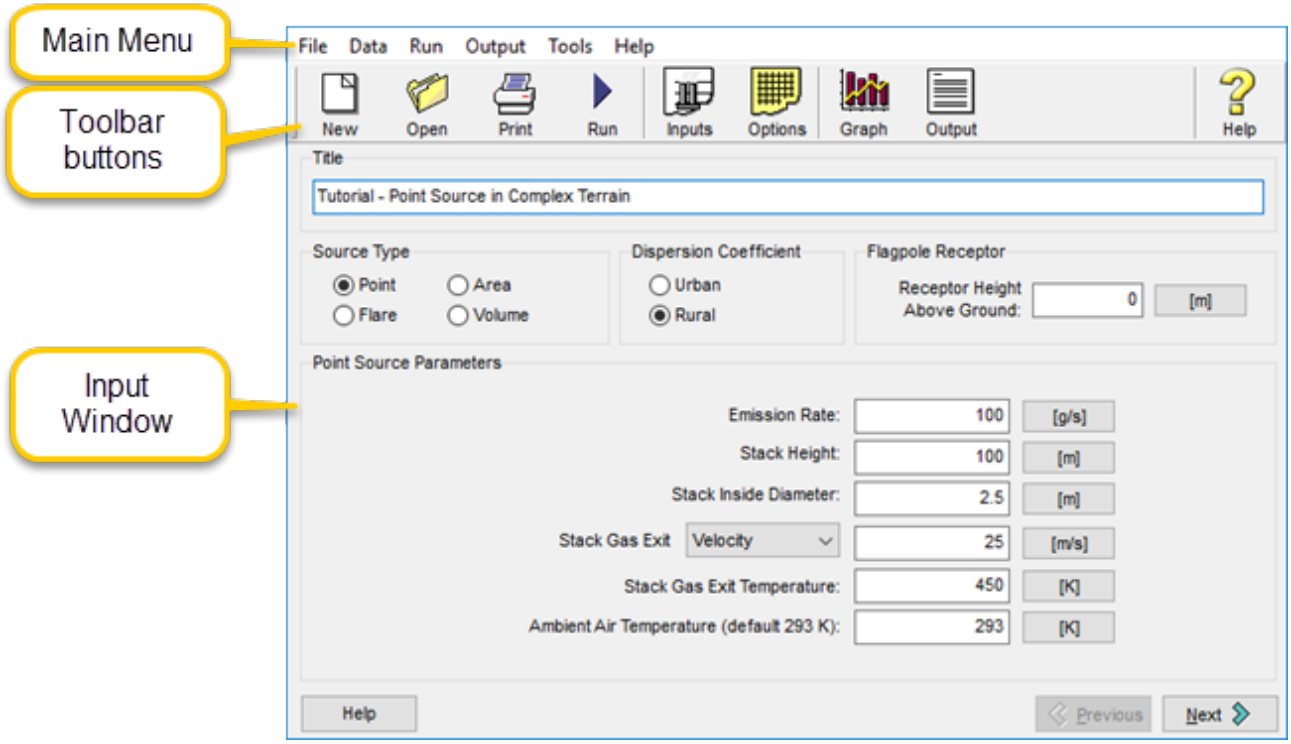
Interface Overview

SCREEN View features a friendly, intuitive interface which provides easy access to all tools. The components of the SCREEN View window are briefly described below:



- **Main Menu:** Displays menu names. To open a menu, move the mouse over the menu name and then click the left mouse button. A drop-down menu appears displaying a list of related commands.
- **Toolbar Buttons:** These are a series of buttons that provide a fast method of selecting some of the menu commands.
- **Input Window:** Displays either the Source Inputs window or the Options window. Here you specify all the information necessary for your project.
- **Help:** Displays context-sensitive help window.

> The **Help** button in the top right corner will display the main **Contents** page of the help.

- **Previous:** Takes you to the previous step (if available).
- **Next:** Takes you to the next step (if available).

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Menu Toolbar Buttons

The **Menu Toolbar Buttons** are shortcuts to some of the menu commands. The function of each one of these buttons is explained below and the equivalent menu bar command is indicated.

New: Lets you create a new SCREEN View project.

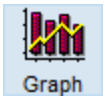
Open: Lets you open an existing SCREEN View project.

Print: Displays the Print Preview dialog, where you can preview what will be sent to the printer.

Run: Displays the Project Status dialog, from where you can verify the completeness of your project and you can run the model.

Inputs: Returns you to the first page of SCREEN View.

Options: Takes you to the second page of SCREEN View.



Graph: Press this button to display the Graph dialog, where you can view a XY plot of hourly and daily averages of the concentration/deposition results at each monitor point.

Output: Opens the output file in a text editor. The default editor can be selected in Preferences - System Editor.

Help: Displays the SCREEN View Help Contents, from which you can select specific topics.

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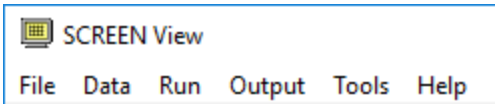
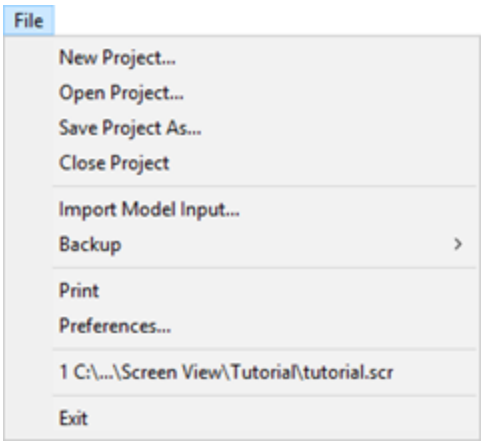
Main Menu

The following menu options are available in SCREEN View:



File Menu

File (Alt+F)



- **New Project...:** Displays the **New Project** dialog, where you specify the name of the new SCREEN View project file (*.scr).
- **Open Project...:** Displays the **Open Project** dialog, where you specify an existing SCREEN View project file (*.scr) to be opened.
- **Save Project As...:** Displays the **Save Project As** dialog, allowing you to save the current SCREEN View project with a different name (*.scr).
- **Close Project:** Closes the SCREEN View project that is currently open and returns to the initial window.
- **Import:** Displays the following submenu options -
  - **Import Model Input...:** Allows you to import input files. The **Import** dialog is displayed from where you can select the name and location of the input file (*.in) you wish to import.

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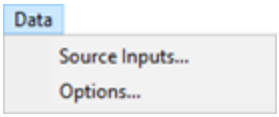
- **Import Old Project...:** Allows you to import projects created in a previous version of SCREEN View. The **Import** dialog is displayed from where you can select the name and location of the project file (*.src) you wish to import.

- **Backup:** Displays the following submenu options -
- **Save to ZIP...:** Allows you to backup your entire project, adding all files from your project to an archive (ZIP file).
- **Extract from ZIP...:** Extracts your project files from the archive file (ZIP file).
- **Print...:** Displays the **Print** dialog where you can select the printer, print range and number of copies.
- **Preferences...:** Displays the Preferences dialog, where you can specify display options.
- **List of Files:** A list of up to four of the most recently used SCREEN View project files is listed here.
- **Exit:** Closes the SCREEN View interface.

Data Menu

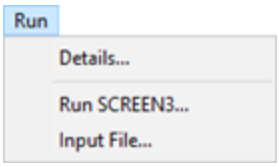
Data (Alt+D)



- **Source Inputs...:** Displays the Source Inputs window where you define options such as the source type and source specific inputs.
- **Options...:** Displays the Options window where you must specify the options for your source. The options available in this window vary according to the type of source specified.

Run Menu

Run (Alt+R)



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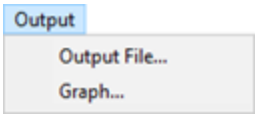
- **Details:** Displays the Details dialog, which lists any missing data for the current project that is required to run the SCREEN3 model.
- **Run SCREEN3...:** Opens the Project Status dialog, which displays a summary of the inputs and options you have defined for the current run and from where you can run the SCREEN3 model.
- **Input File...:** Displays the **SCREEN Input File** (*.in) for the current project using a text editor. The editor may be changed in Preferences - System Editor.

Output Menu

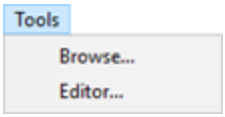
Output (Alt+O)



- **Output File...:** Displays the **SCREEN Output File** (*.out) for the current run using a text editor. The editor may be changed in Preferences - System Editor.
- **Graph...:** Displays the Graph dialog where you can view your results in graphical format.

Tools Menu

Tools (Alt+T)



- **Browse...:** Opens a **Windows Explorer** dialog allowing you to browse through files.
- **Editor...:** Opens the default text editor. The editor may be changed in Preferences - System Editor.

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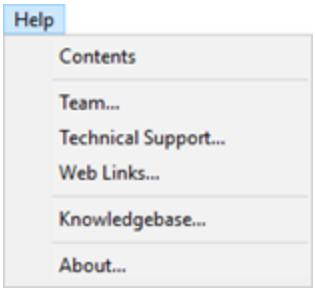
Help Menu

Help (Alt+H)



- **Contents:** Displays SCREEN View Help Contents, from where you can select topics.
- **Team...:** Displays information on the SCREEN View development team.
- **Technical Support...:** Displays a dialog containing available technical support options for Lakes Environmental software.
- **Web Links...:** Displays a dialog containing links to sites useful to the SCREEN View user.
- **Knowledgebase...:** Opens the SCREEN View knowledgebase on the Lakes Environmental web site; use the username and password you were assigned for the download site.
- **About...:** Displays the copyright notice, authors, and version number for the SCREEN View interface.

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Tutorial

The **SCREEN View Tutorial** guides you through the basic steps in using SCREEN View to set up and run a SCREEN model and view the generated results.

The SCREEN View **View Tutorial** has the following steps, which should be followed in the order provided below.

- The Problem
- Creating a SCREEN View Project
- Specifying Source Inputs
- Specifying Project Options
- Running the Model
- Reviewing Output Options

The Problem

An isolated stack in a rural environment is expected to have an impact on some nearby terrain features. The pollutant source has the following characteristics:

- Emission rate: 100 g/s
- Stack height: 100 m
- Stack inside diameter: 2.5 m
- Stack gas exit velocity: 25 m/s
- Stack gas exit temperature: 450 K
- Ambient air temperature: 293 K

Terrain elevations and distances to sources that should be used for this example will be supplied during the tutorial.

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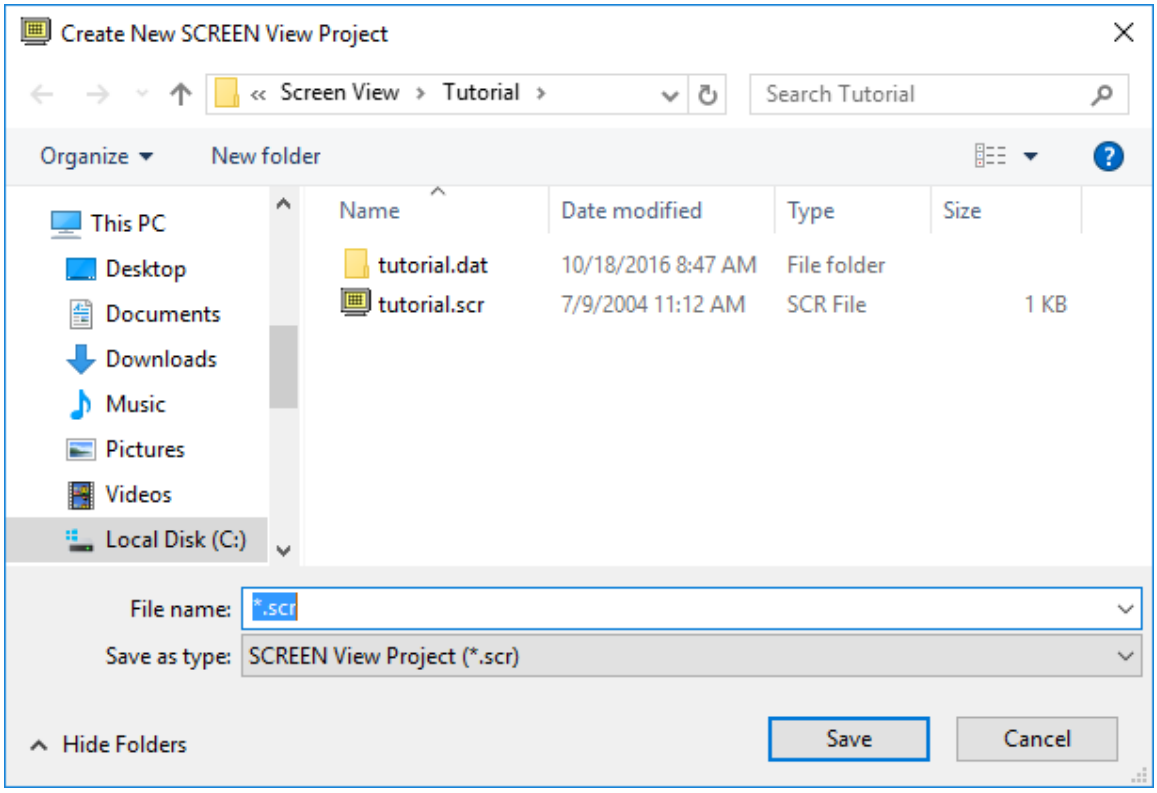
Creating a SCREEN View Project

Step 1. From the Windows start menu, choose **Programs | Lakes Environmental | SCREEN View** or double click on the SCREEN View icon located in the Lakes Environmental folder on your desktop.

Step 2. The **About** dialog appears. Click on the **OK** button and the SCREEN View main window is displayed.

Step 3. Select **File | New Project** and the **Create New SCREEN View Project** dialog will appear. Select the location where you want to save your project (working directory) and specify a file name. You can also choose to create a project folder in which to store your project data. Click **Save** to continue.



Create New SCREEN View Project dialog

If you want to simply browse this tutorial, the tutorial project file **tutorial.scr** is included in the **Tutorial** folder of your installation directory (by default C:\Lakes \SCREEN View\Tutorial). Cancel the new project and open the completed tutorial file (**File | Open**). To create your own identical project, follow the steps outlined here, using a different project name.

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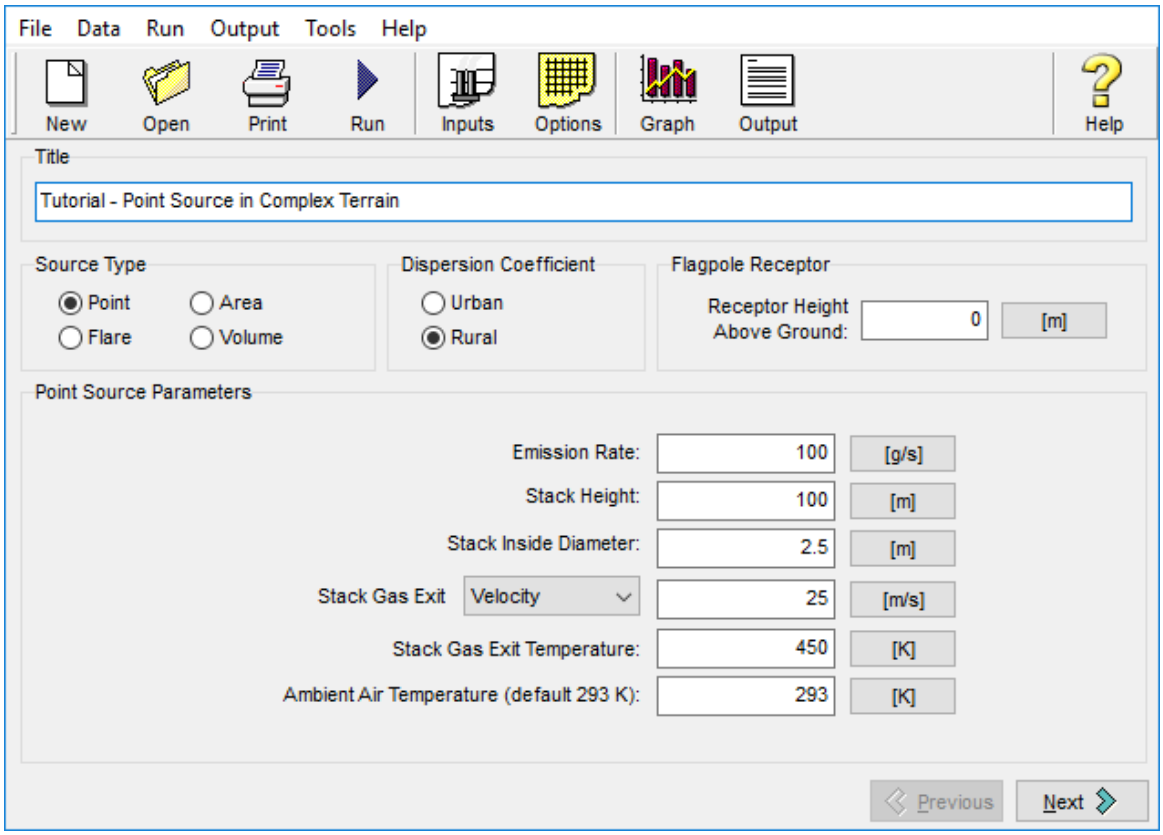
Specifying Source Inputs

Step 1. As you open or create a project the first window displayed will be the **Source Inputs** window. In the title box enter a descriptive title for your project such as **Tutorial - Point Source** in **Complex Terrain**. The title can be up to 79 characters long, and will be included in the output file generated by the SCREEN3 model.



Source Inputs Window

Step 2. Select **Point** in the **Source Type** panel, **Rural** in the **Dispersion Coefficient** panel and enter **0** m in the **Flagpole Receptor** panel. Enter the following values in the **Point Source Parameters** panel:

Parameter	Value
Emission Rate	100 (m)
Stack Height	100 (m)

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Parameter	Value
Stack Inside Diameter	2.5 (m)
Stack Exit Gas (Velocity)	25 (m/s)
Stack Gas Exit Temperature	450 (K)
Ambient Air Temperature (default 293K)	293 (K)

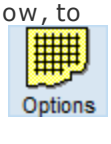
The caption on the **Unit Buttons**, located on the right hand side of each input box, shows which unit is currently in use. For this tutorial, all our inputs are in metric units. If you need to use imperial units or a combination of both, just click on the **Unit Buttons** to toggle between these units.

For **Point** source, the user can either enter the **Stack Gas Exit Velocity** or the **Stack Gas Exit Flow Rate**. The default input option is the **Stack Gas Exit Velocity**. To input a flow rate instead, just click on the down arrow of the drop-down list box and select **Flow Rate**.

SCREEN View inputs as defaults an ambient air temperature of 293K and a receptor height above ground of 0 m. To change the default values, enter the values for the area being modeled.

Specifying Project Options

Step 1. Once you have completed entering the parameters in the **Source Inputs** window, to proceed to the **Options** window click on the

button or click on the 

toolbar button.

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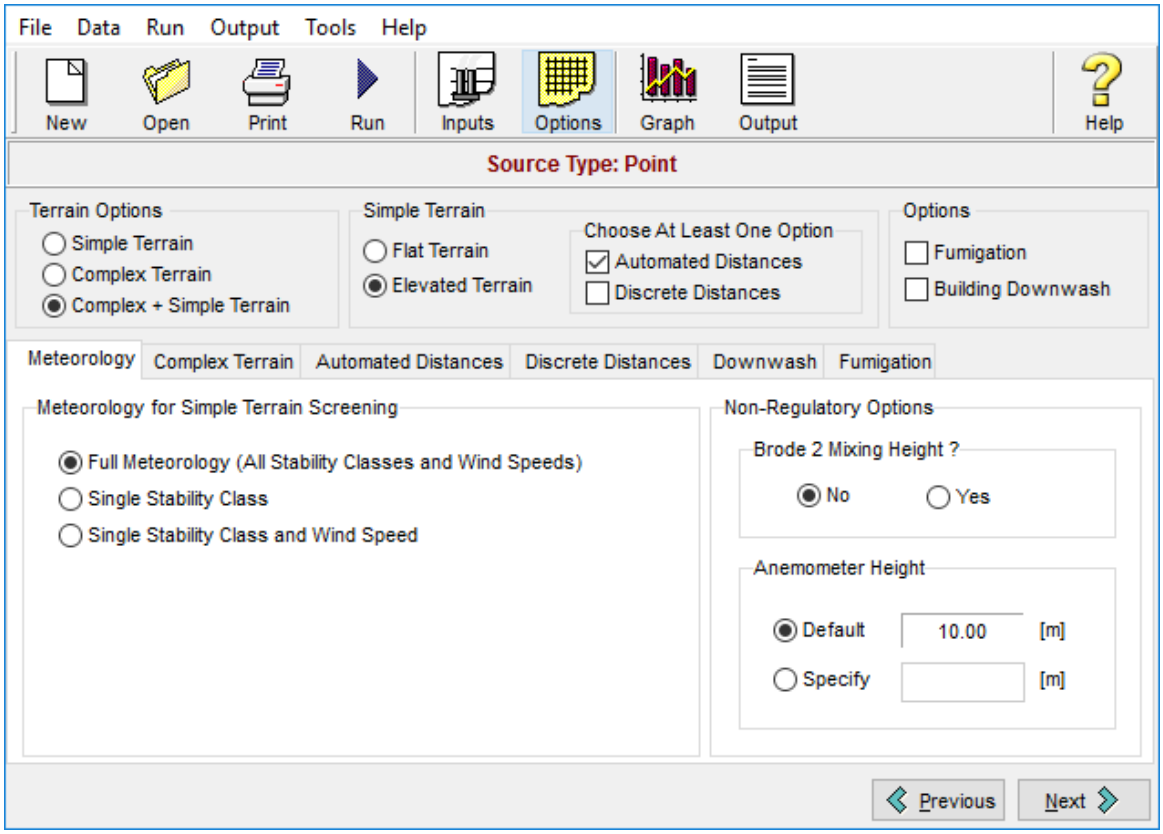
The options available in the **Options** window depend on the type of source being modeled (**Point**, **Flare**, **Area**, or **Volume**). For a **Point** source, the following **Options** window is displayed:



Options window for a Point Source

At the top of the Options window you will see the summary panel, which contains the options available for the source being modeled.

Step 2. Select the following options in the **Summary Panel**:

Complex Terrain: Check the **Complex Terrain + Simple Terrain** box option. This will allow for the simple terrain options to be available and to model the effect of elevated terrain above stack height on the maximum concentration.

Simple Terrain:

- By default the **Flat Terrain** is selected, for this tutorial select **Elevated Terrain**.

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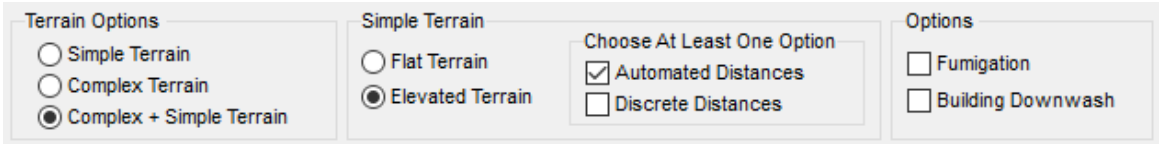
- **Automated Distances:** Select **Automated Distances**.
- **Discrete Distances:** Do not select this option.

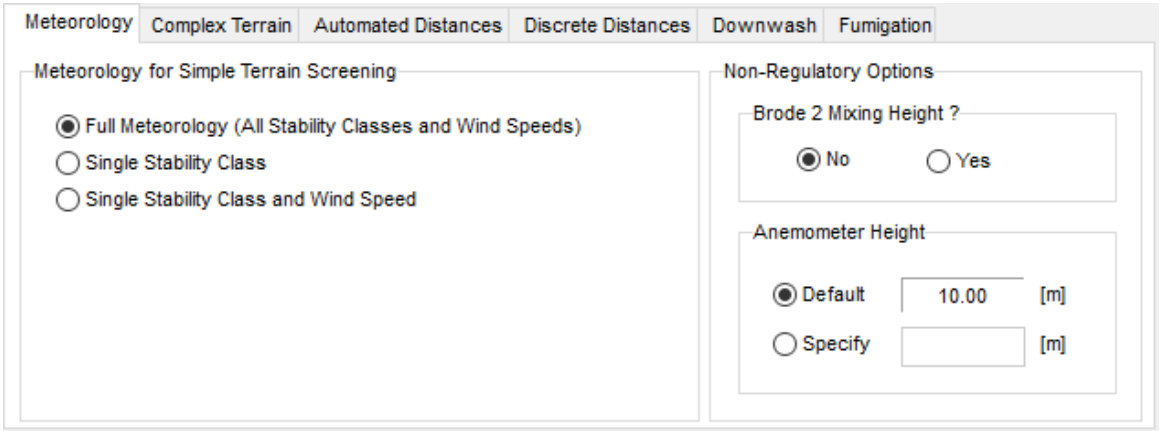
Options:

- **Fumigation:** Do not select this option.
- **Building Downwash:** Since we are assuming an isolated stack, leave this option unselected. This will indicate that building downwash effects do not influence the stack release.



Summary Panel

Step 3. Below the **Summary Panel** in the **Options** window the **Meteorology** tab should be displayed. For this tutorial, leave all the default options (**Full Meteorology**, **Brode 2 Mixing Height Algorithm - No**, and **Default Anemometer Height** of **10** meters).



Meteorology Options

Step 4. Click on the

button to proceed to the **Complex Terrain** tab. Enter the following values in meters in the **Complex Terrain** tab:

Terrain Height Above Stack Base	Distance from Source
175	5000

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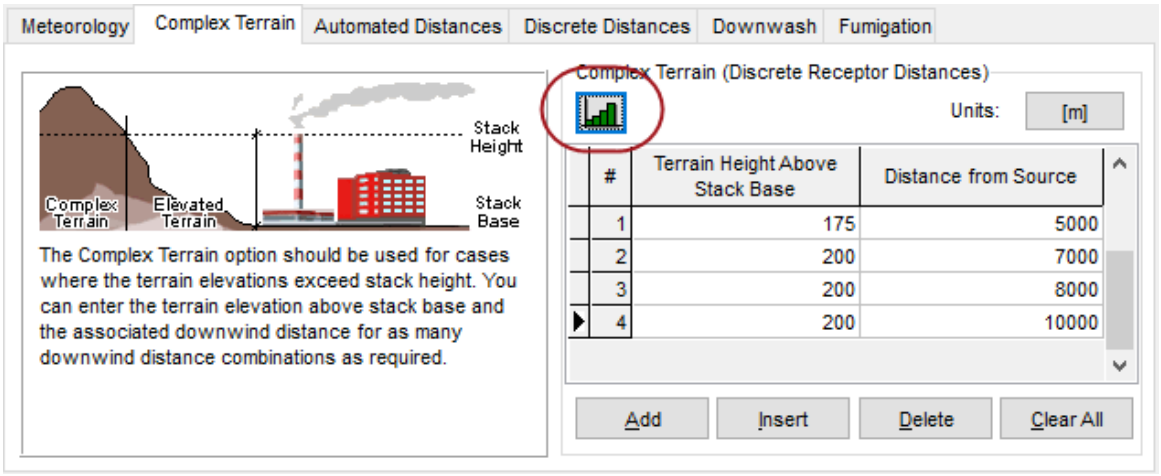
Terrain Height Above Stack Base	Distance from Source
200	7000
200	8000
200	10000



Complex Terrain Options

Step 5. Click on the to open the **Terrain Height Viewer** window and view the terrain profile you entered for complex terrain. Once you have finished observing the terrain profile click on the **Close** button.

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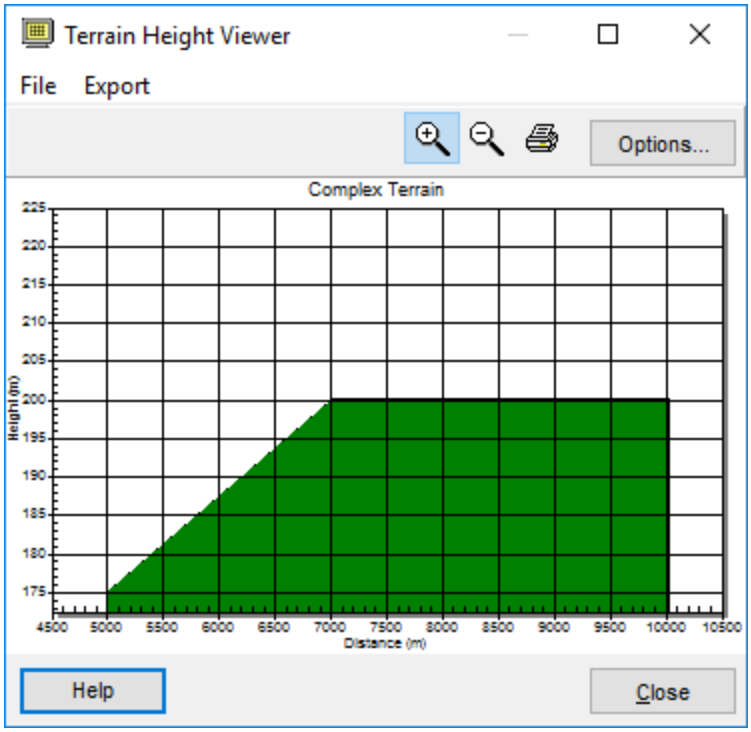

Terrain Height Viewer – Complex Terrain

Step 6. Click Next to continue. The **Automated Distances** tab should now be displayed. Enter the following values in meters in the **Automated Distances** tab:

Terrain Height Above Stack Base	Minimum Distance	Maximum Distance
30	50	1000
70	1000	3000
90	3000	5000
100	5000	10000

To facilitate validation of the input data, SCREEN View does not allow entering the following:

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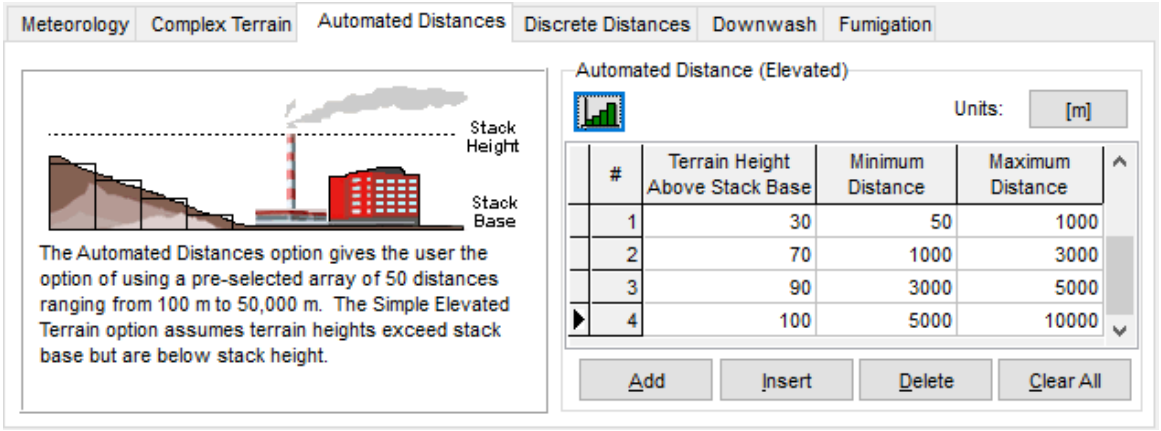
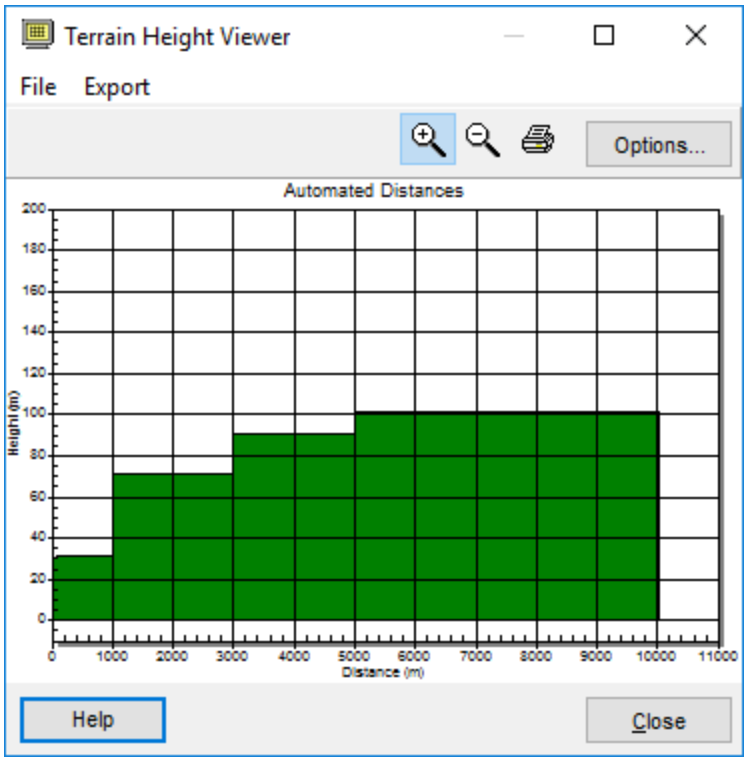
- A **Maximum Distance** before you input a **Minimum Distance**.
- A **Maximum Distance** that is smaller than the **Minimum Distance** for the same row.
- A **Minimum Distance** that is smaller than the previous **Maximum Distance**.



Automated Distances Options

Step 7. Click on the to open the **Terrain Height Viewer** window and view the terrain profile you entered for automated distance. Once you have finished observing the terrain profile click on the **Close** button.



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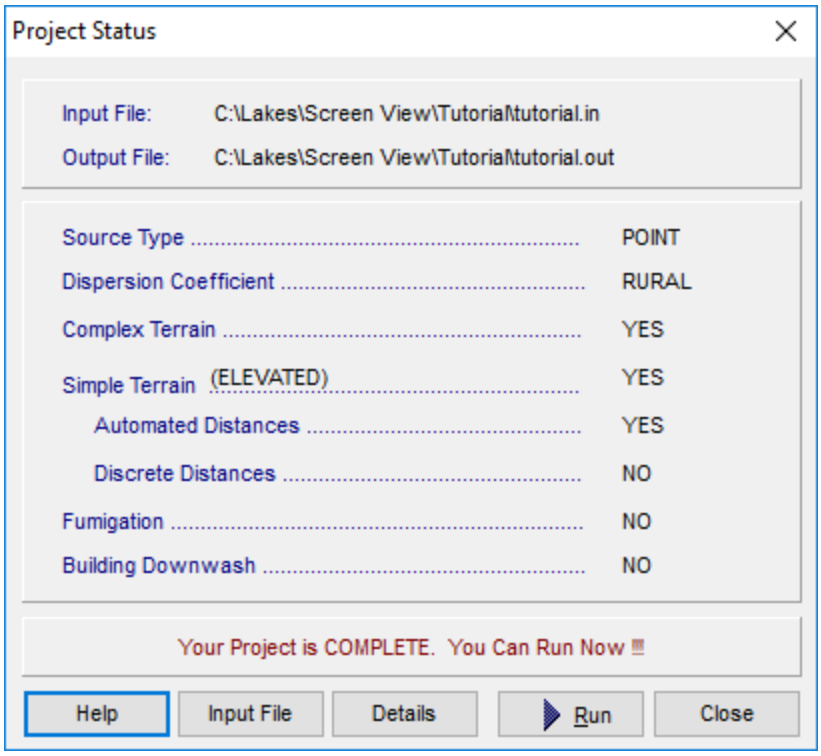
Terrain Height Viewer – Automated Distances

Step 8. Click Next to continue. You don't need to enter values in the **Discrete Distances** tab, the **Downwash** tab or the **Fumigation** tab since they are inactive for this tutorial. You should now have finished inputting all the necessary data.

Running the Model

Step 1. You can now run your tutorial by clicking on the next button until you reach the **Project Status** dialog, clicking the Run button on the menu toolbar, or select **Run | Run SCREEN3...** or click on the RUN button from the menu toolbar.



Project Status dialog

Step 2. The **Project Status** window will identify if your project is complete or incomplete. If your project is complete click on the Run button, else click on the Details button to verify what information is missing. Input the missing values and run your project.

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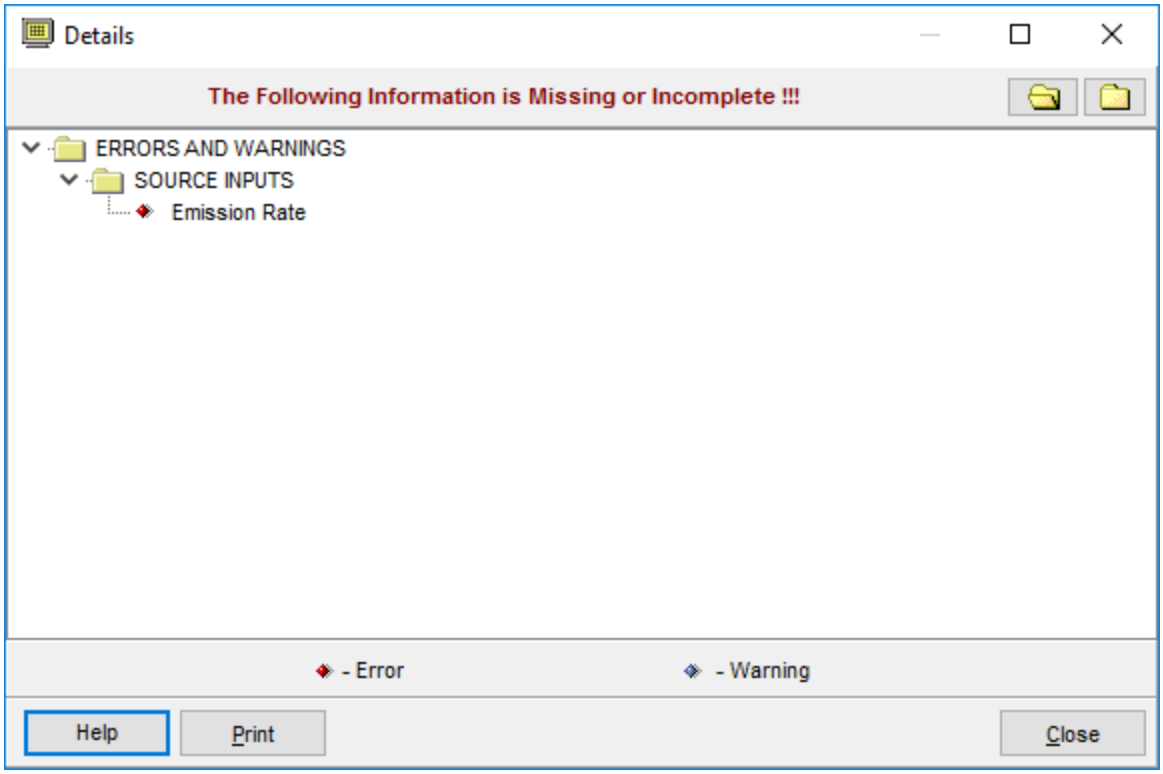
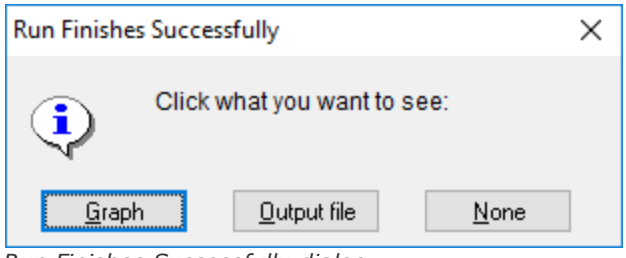


Details dialog

In the above picture, the **Details** dialog is indicating that the emission rate is missing from the **Source Inputs**.

Reviewing Output Options

Step 1. Congratulations! You have now completed the tutorial project. If the project was executed successfully the **Run Finished Successfully** dialog will be displayed.



Run Finishes Successfully dialog

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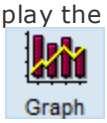
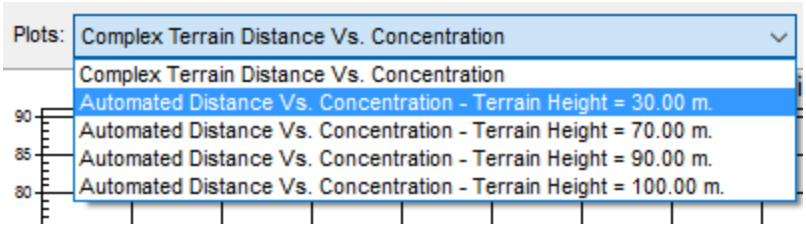
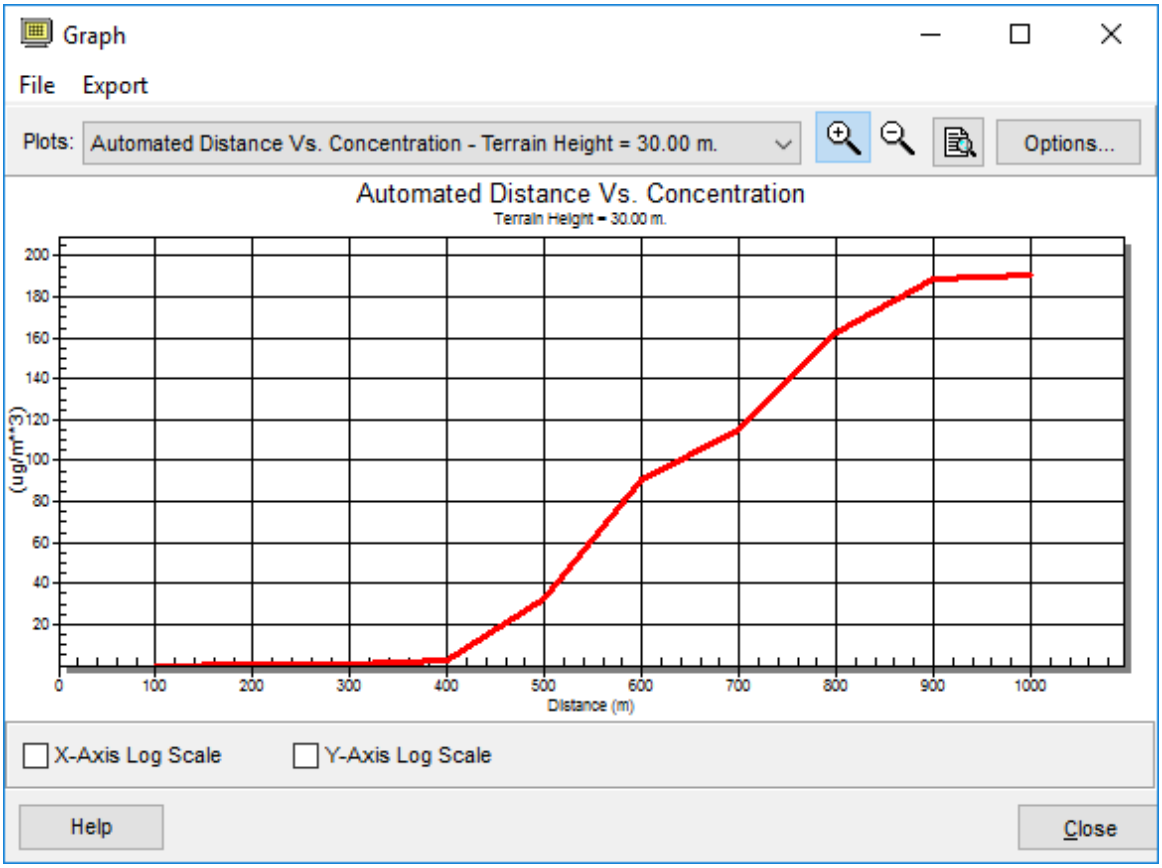
Step 2. Step 16: Select the **Graph** button to open the **Graph** window. You can also display the **Graph** window by choosing **Output | Graph...** from the menu or clicking on the 

button. You can view any graph from the plots list, click on the arrow to display the drop down list box for the available output graphs and select a graph to view.



Select Plot Type



Graph window

Step 3. Click on the button to preview the output file for your current project.

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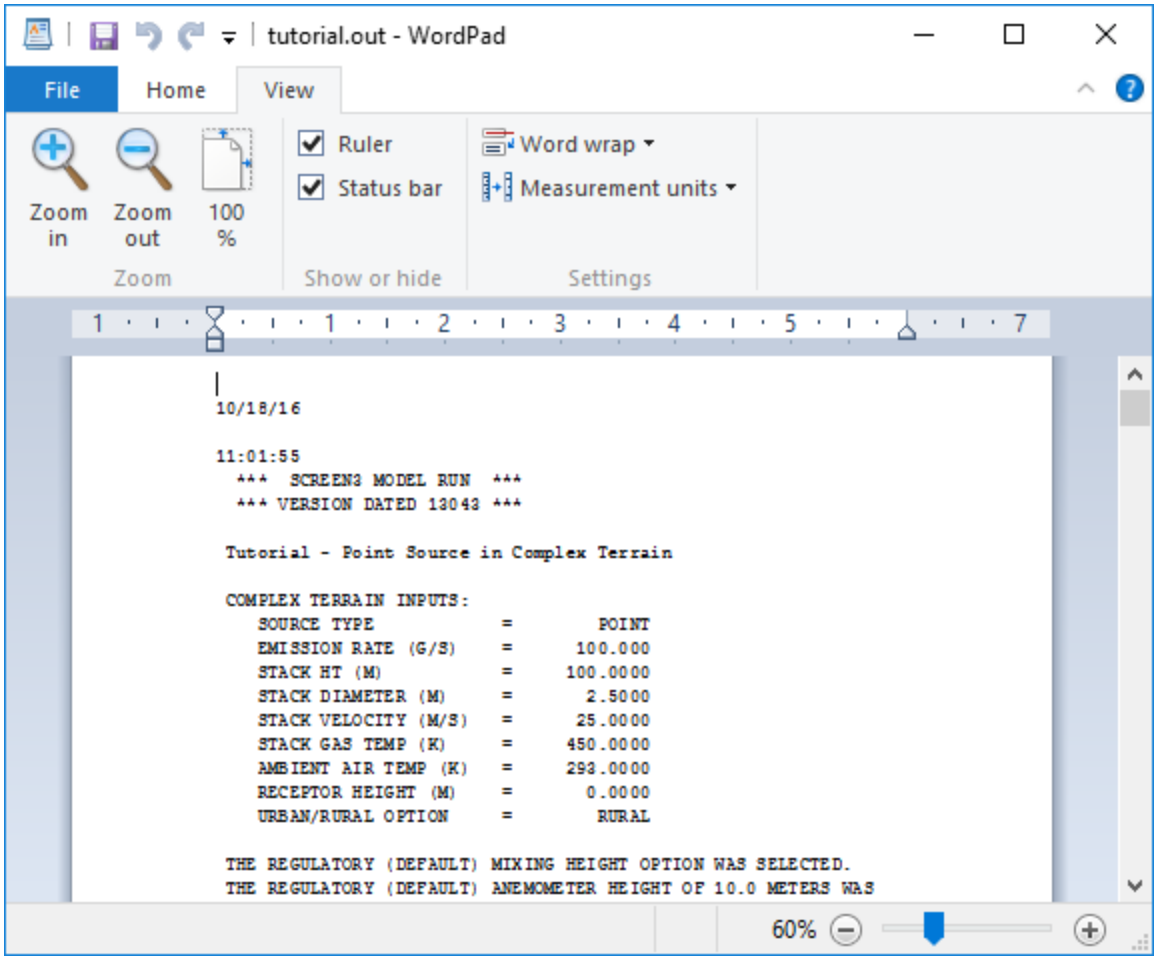
Step 4. Click on the Close button to close the **Graph** window. You can also display the **Output** file by clicking on the Output button or choosing from the menu **Output | Output File...** to view your project outputs.



Output File window

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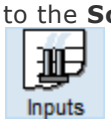
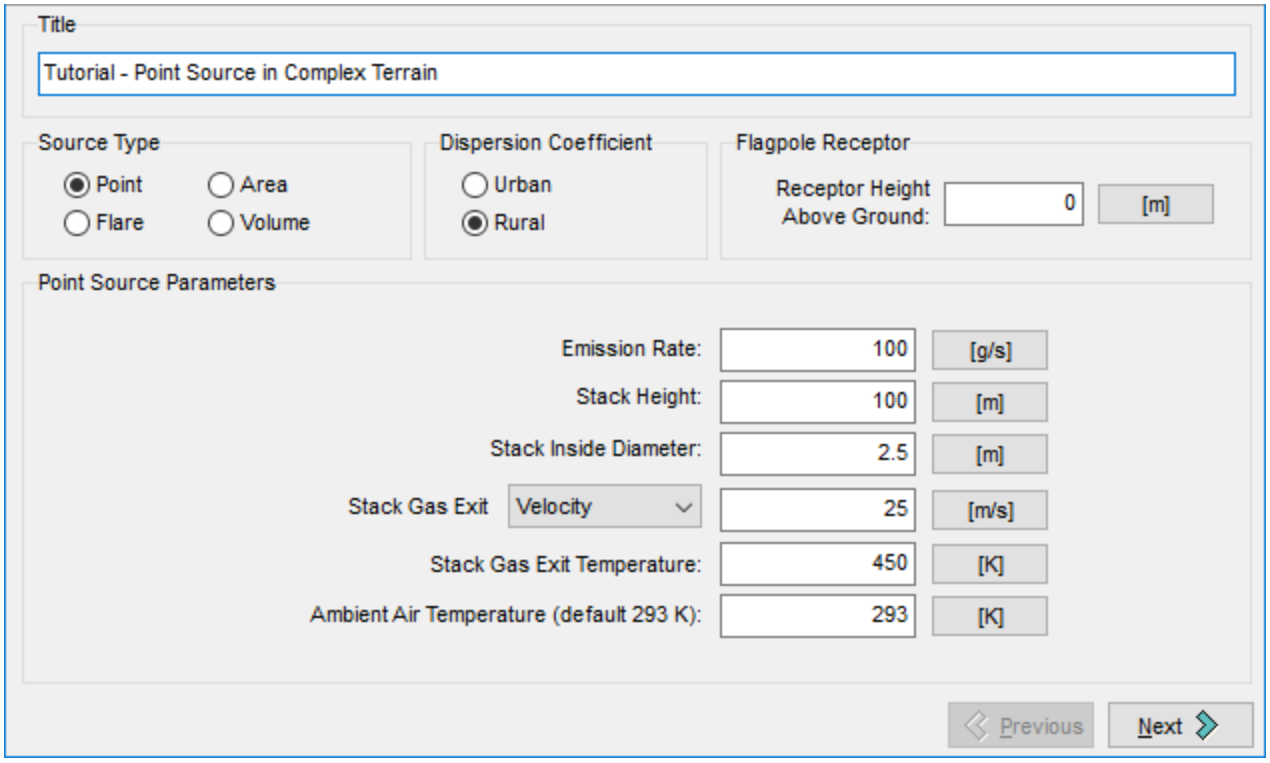
Source Inputs

Source Inputs

The **Source Inputs** window is typically the first window displayed after creating a new project or opening an existing project. If you are in another window, you can return to the **Source Inputs** screen by selecting **Data | Source Inputs** from the menu or clicking on the 

button. The **Source Inputs** screen allows you to specify your project title, dispersion coefficient, source type and parameters, and receptor height.



Source Inputs window

The following information must be provided in the **Source Inputs** screen:

- **Title:** Enter the desired project name here. This is a descriptive title for the project, up to 79 characters, and must be provided for each run. SCREEN View places your project file name here as the default, but this can be changed at any time.

- **Source Type:** For each run, you must select one of the four options that best identifies the source being modeled. The source types available are -

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- **Point Source:** Localized source such as a stack or isolated vent.
- **Flare Source:** Localized point source, where a high release heat rate occurs, such as in flares and flames.
- **Area Source:** Ground-based sources where emissions are spread over an area such as a landfill. Areas which have irregular shapes can be simulated by dividing the area source into multiple rectangles that approximate the geometry of the area source.
- **Volume Source:** Three-dimensional type source such as fugitive leaks on an industrial facility or dust emissions from a storage pile.

- **Dispersion Coefficient:** You must select a Dispersion Coefficient to classify your modelling site as either rural or urban.
- **Source Parameters:** Depending on the source type you selected, the required source inputs required will vary. See the following sections for a description of the source parameters required for each source type -
  - Point Source Parameters
  - Flare Source Parameters
  - Area Source Parameters
  - Volume Source Parameters

You can provide the source input parameters in either metric or imperial units. The conversion of units is automatically done by clicking on the units button located to the right of each input field.

Note that as you press these buttons, the caption of the button changes between metric and imperial units. If you have already entered a value in the input field, then SCREEN View automatically converts from one unit to the other.

- **Receptor:** In this panel you must specify the receptor height above ground. This may be used to model impacts at "flagpole" receptors. A flagpole receptor is defined as any receptor located above ground level and can be used, for example, to represent the roof or balcony of a building. The default value is assumed to be 0.0 m (i.e., ground-level receptors).

Once you have finished specifying your source inputs, click on the

button or the

button to take you to the Options window where you must define the options for your source.

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Dispersion Coefficient

You can select between two types of dispersion coefficients - **Urban** or **Rural**. It is important to select the applicable dispersion coefficient for your site, as dispersion over urban areas will differ from rural areas.

Determination of the applicability of urban or rural dispersion is based upon the land use within a 3km radius (Ao) of the source. You can use one of the two procedures described below to do this -

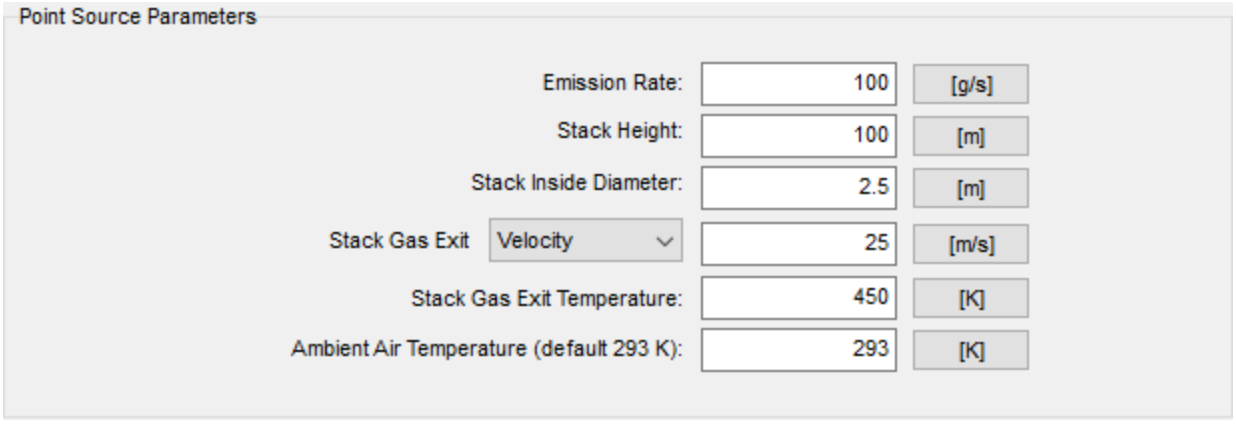
- **Land Use Procedure:** If land use types I1, I2, C1, R2, and R3 (industrial, commercial or residential) account for 50 % or more of Ao, select the urban option, otherwise use the **Rural** option.

- **Population Density Procedure:** Compute the average population density (p) per square kilometer within Ao. If p > 750 people/km2, select the urban option; otherwise use appropriate rural dispersion coefficients.

Of the two methods, the land use procedure is considered more definitive. Population density should be used with caution and should not be applied to highly industrialized areas where the population density may be low and thus a rural classification would be indicated, but the area is sufficiently built-up so that the urban land use criteria would be satisfied. In this case, the classification should be urban, and urban dispersion parameters should be used.

Point Source Parameters

For a **Point Source**, the following parameters are displayed in the **Source Inputs** panel:



Source Inputs - Point Source Inputs

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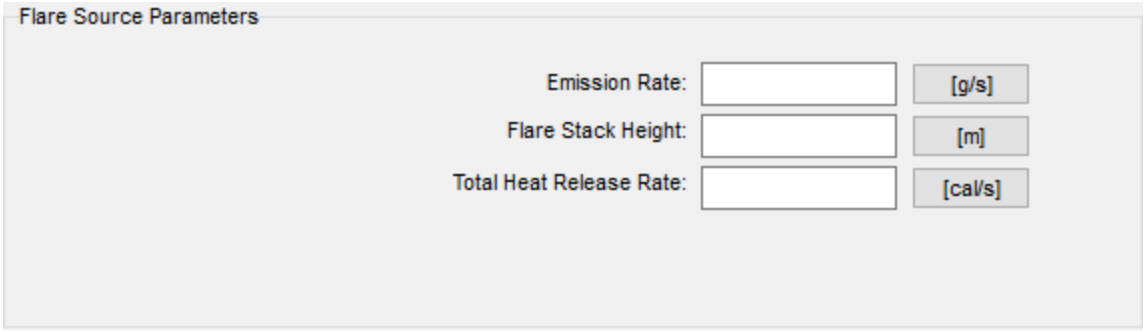
The following parameters must be defined:

- **Emission Rate:** Enter the mass emission rate of the pollutant.
- **Stack Height:** Enter the stack height above ground.
- **Stack Inside Diameter:** Enter the stack inside diameter.
- **Stack Gas Exit Velocity or Stack Gas Exit Flow Rate:** Here you can chose to provide a value for either the stack gas exit velocity or the stack gas exit flow rate. Select from the drop-down list the parameter you wish to use and enter the value in the corresponding text box. If a stack gas exit flow rate is entered, the program will convert it into an exit velocity to be used in the plume rise equations of the model.
- **Stack Gas Exit Temperature:** Enter the temperature of the released gas. If this data is not available, it may be approximated from guidelines that yield typical values for those parameters for existing sources.
- **Ambient Air Temperature:** Enter the average atmospheric temperature in the vicinity of the source. Ambient air temperature data are collected hourly at NWS (National Weather Service) stations and are available from NCDC or from the SCRAM BBS. If no ambient temperature data are available, assume a default value of 293 degrees Kelvin. For non-buoyant releases, you should input the same value for the stack temperature and ambient temperature.

Flare Source Parameters

For a **Flare** source, the following parameters are displayed in the **Source Inputs** panel:



Source Inputs - Flare Source Parameters

The following parameters must be defined:

- **Emission Rate:** Specify here the mass emission rate of the pollutant.

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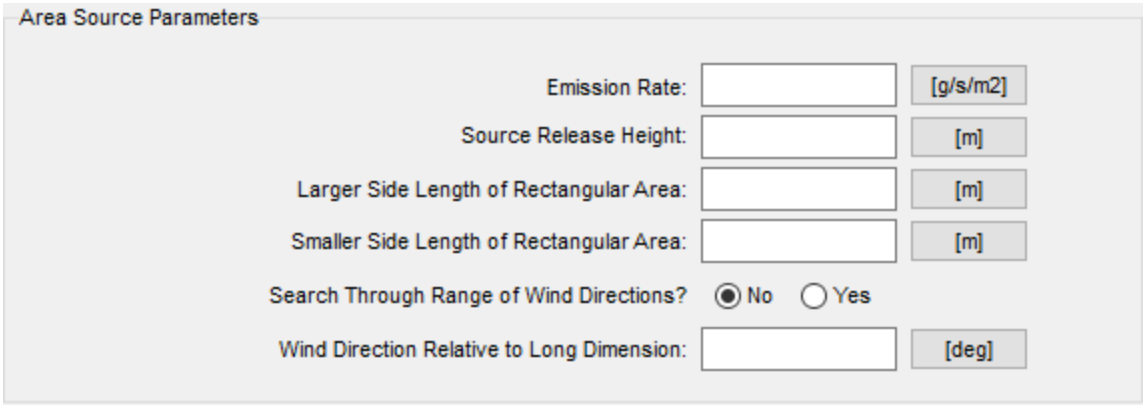
- **Flare Stack Height:** Enter the stack height above ground.
- **Total Heat Release Rate:** Enter the heat release rate for the flare.

Area Source Parameters

For an **Area** source, the following parameters are displayed in the **Source Inputs** panel:



Source Inputs - Area Source Parameters

The following parameters must be defined:

- **Emission Rate:** Enter the emission rate of the pollutant. The emission rate for area sources is input as an emission rate per unit area.
- **Source Release Height:** Specify here the source release height above ground.
- **Larger Side Length of Rectangular Area:** Enter the larger side of the rectangular source .
- **Smaller Side Length of Rectangular Area:** Enter the smaller side of the rectangular source.
- **Search Through Range of Wind Directions?:** Since the concentration at a particular distance downwind from a rectangular area is dependent on the orientation of the area relative to the wind direction, the SCREEN model provides the user with two options for treating wind direction. In SCREEN View these two options are represented by the Yes and No options.
    - **Yes:** By selecting this option, EPA's SCREEN model will search through a range of wind directions to find the maximum concentration. The range of directions used in the search is determined from a set of look-up tables based on the aspect ratio of the area source, the stability category, and the downwind distance. This is the regulatory default option and should be used for most applications.

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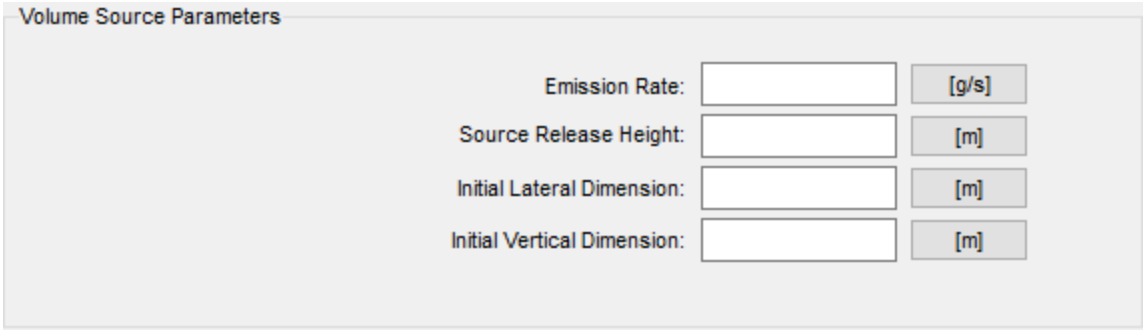
- **No:** By selecting this option, you must specify a wind direction orientation relative to the long axis of the rectangular area. This option may be used to estimate the concentration at a particular receptor location relative to the long area. If this option is selected, then the Wind Direction Relative to Long Dimension option becomes available and you must input a wind direction.

- **Wind Direction Relative to Long Dimension:** This option is only available if you have selected No for the Search Through Range of Wind Directions? option. In this input field, you need to input a wind direction orientation relative to the long axis of the rectangular area.

Volume Source Parameters

For a **Volume** source, the following parameters are displayed in the Source Inputs panel:



Source Inputs - Volume Source Parameters

The following parameters must be defined:

- **Emission Rate:** Enter the emission rate of the pollutant.
- **Source Release Height:** Enter the source release height above ground.
- **Initial Lateral Dimension:** Enter the initial lateral dimension of the volume source plume.
- **Initial Vertical Dimension:** Enter the initial lateral dimension of the volume source plume.

> See Estimating Initial Dimensions for Volume Sources for guidance on determining initial dimensions.

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Estimating Initial Dimensions for Volume Sources

When a volume source is chosen, the initial dimensions of the volume source plume must be determined. The table below from the Estimating the Air Quality Impact of Stationary Sources (EPA 1995d) document provides a summary of the Suggested Procedures for Estimating **Initial Lateral Dimension** (syo) and **Initial Vertical Dimension** (szo) for Single Volume Sources.

Description of Source	Initial Lateral Dimension	Initial Vertical Dimension
Surface-Based Source (he ~ 0)	syo = side length 4.3	szo = vertical dimension 2.15
Elevated Source (he > 0) on or adjacent to a building	syo = side length 4.3	szo = building height 2.15
Elevated Source (he > 0)not on or adjacent to a building	syo = side length 4.3	szo = vertical dimension 4.3

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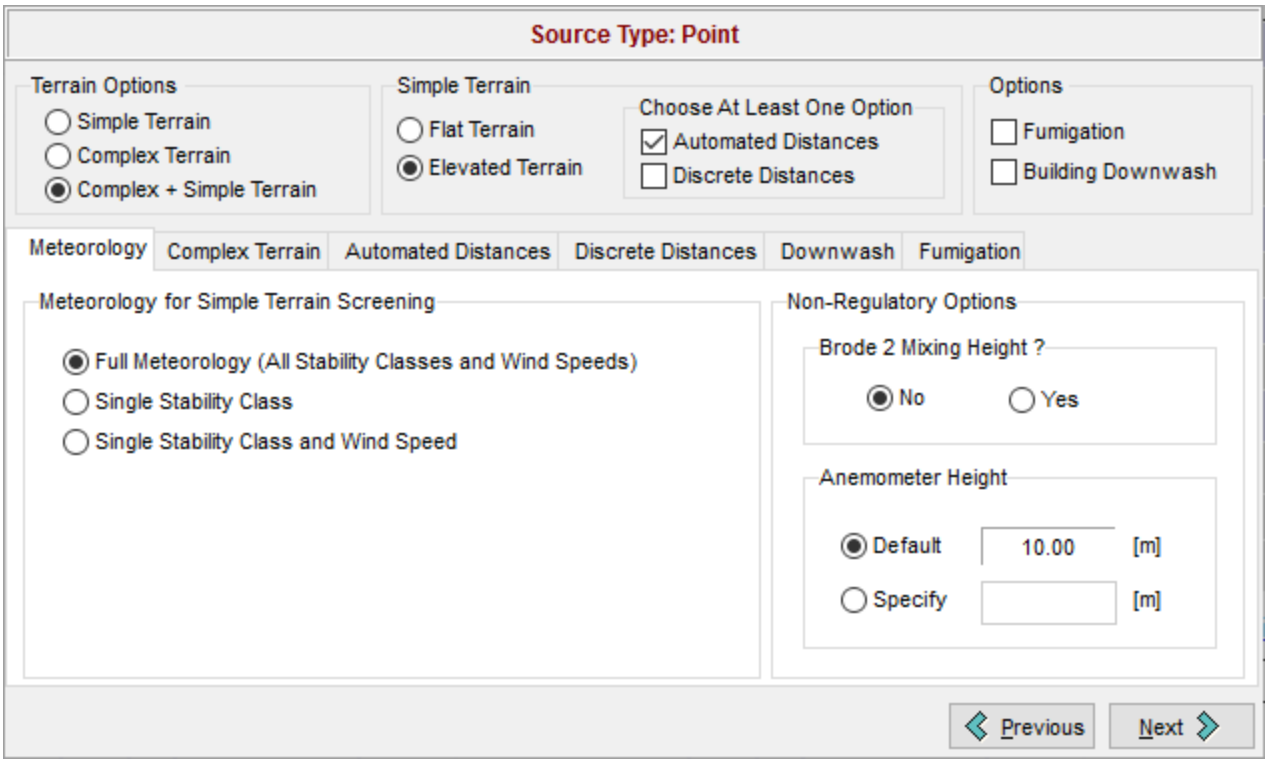
Project Options

Options

The **Options** window displays the input options necessary to run the SCREEN model. You have access to the Options window by clicking on the

button.



Options window

The options available in this tab vary according to the source type selected in the Source Inputs window. See the table below for a summary of the options available for each source type:

Options	Source Type			
	Point	Flare	Area	Volume
Simple Flat Terrain	*	*	*	*

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Options	Source Type			
	Point	Flare	Area	Volume
Simple Elevated Terrain	*	*	x	*
Complex Terrain	*	*	x	x
Building Downwash	*	*	x	x
Fumigation	*	*	x	x

At the top of the Options screen is the Summary panel. Displayed here are all the options available to the source type you have specified in the Source Inputs window.

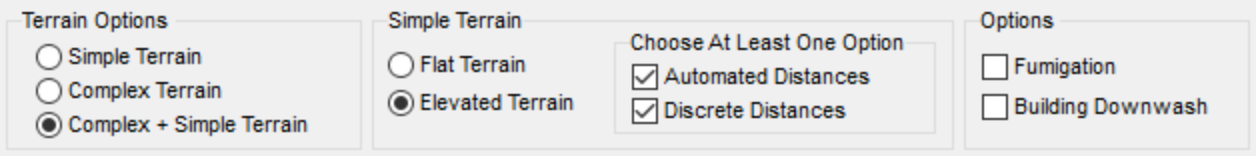
There are six tabs in the Options window. See the following sections for a detailed description of each of these tabs and the options found within them:

- Meteorology tab
- Complex Terrain tab
- Automated Distances tab
- Discrete Distances tab
- Downwash tab
- Fumigation tab

You can click on the Previous and Next buttons to navigate between tabs.

Summary Panel

The **Summary** panel located at the bottom of the Options window allows you to view and select the options available to you for the source type specified.



Summary Panel

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- **Terrain Options:** Select whether or not you are using Simple Terrain, Complex Terrain, or both.

- **Simple Terrain:** You can select from two types of simple terrain, **Flat Terrain** and **Elevated Terrain**. For both of these terrain types you can choose to model with either or both of the distance options, Automated Distances and Discrete Distances. Make sure to select at least one option.

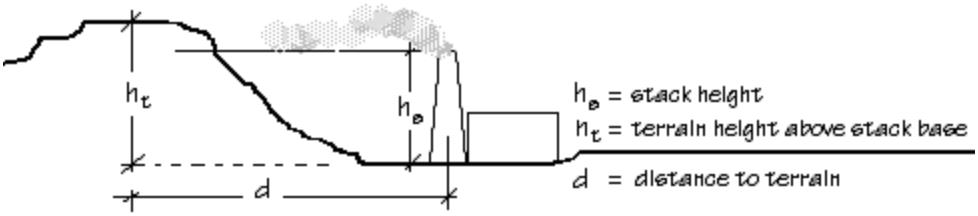
- **Options:** Allows you to specify the following options:

  - Building Downwash: Check this box if you would like to consider building downwash for your project.

  - Fumigation: This option becomes available to you only if you are using a Point or Flare source, the stack height is equal to or greater than 10m, and the Rural Dispersion Coefficient is selected.

Simple Terrain

The **Simple Terrain** option is available only for **Point** and **Flare** sources, and if you have selected **Simple Terrain** or **Complex Terrain + Simple Terrain** option in the Summary Panel.



When modeling **Simple Terrain** you are given the option of modeling either:

- **Simple Flat Terrain:** This is where terrain heights are assumed not to exceed stack base elevation. If this option is used, then terrain height is considered to be 0.0 m.

- **Simple Elevated Terrain:** This is where terrain heights exceed stack base but are below stack height. If this option is used, then the terrain height above stack base should be specified. If terrain heights above physical stack height are entered, SCREEN View gives a warning message and you will have to re-enter a valid height value.

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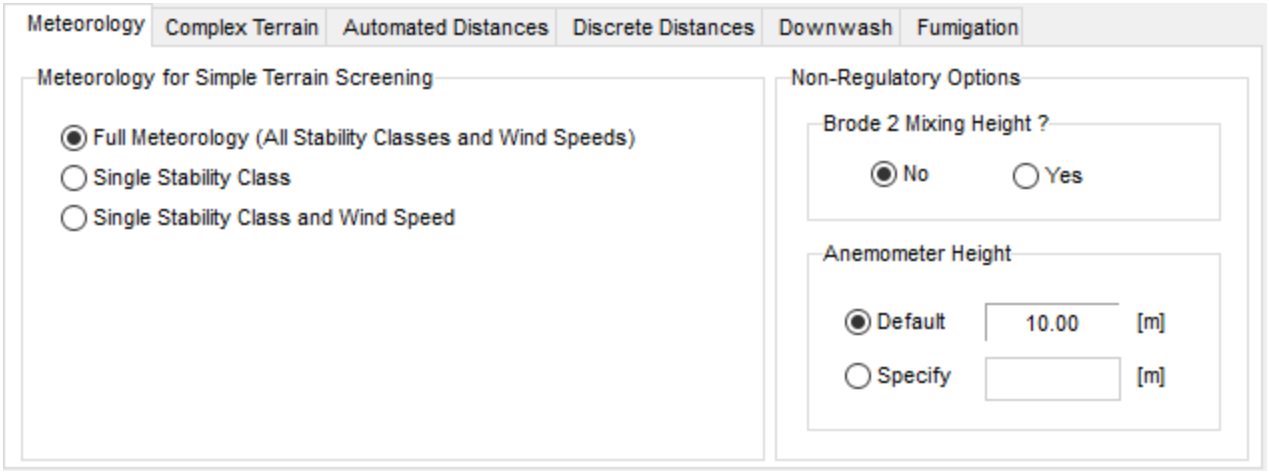
To model **Simple Flat Terrain** or **Simple Elevated Terrain**, you can choose either or both of the distance options - Automated Distances and/or Discrete Distances.

Options - Meteorology

The **Meteorology** tab displays three options for meteorology only if the **Simple Terrain** (**Flat** or **Elevated**) option is selected. If you have selected the **Complex Terrain** option, the SCREEN model automatically selects the meteorology.



Options window - Meteorology tab

> For the **Complex Terrain** option, SCREEN automatically uses stability class F or E, for rural and urban dispersion coefficients respectively, and a wind speed of 2.5 m/s.

Meteorology for Simple Terrain Screening

- **Full Meteorology (All Stabilities and Wind Speeds):** All the meteorological combinations between stability classes and their associated wind speeds are considered to identify the "worst case" meteorological conditions, that is, the combination of wind speed and stability that results in the maximum ground level concentrations. The wind speed and stability class combinations used by the SCREEN model are given in the following table -

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Pasquill-Gifford Stability Class	10-Meter Wind Speed (m/s)												
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	8.0	10.0	15.0	20.0
A	*	*	*	*	*								
B	*	*	*	*	*	*	*	*	*				
C	*	*	*	*	*	*	*	*	*	*	*		
D	*	*	*	*	*	*	*	*	*	*	*	*	*
E	*	*	*	*	*	*	*	*	*				
F	*	*	*	*	*	*	*						

See also Pasquill-Gifford Stability Classes.

- **Single Stability Class:** This option considers the range of wind speeds for a specified stability class. You can select from the Stability drop-down list the stability class (A through F) to be used.

- **Single Stability Class and Wind Speed:** This option allows you to consider a single stability class and wind speed combination. Select a stability class from the Stability drop-down list and enter a value for the wind speed. The wind speed value should fall within the range for the specified stability class. This wind speed range is displayed below the wind speed field box and can also be determined from the above table.

Generally the Full Meteorology option should be selected. The other two options may be useful when particular meteorological conditions are of concern, but are not recommended for routine uses of SCREEN.

Non Regulatory Options

- **Brode 2 Mixing Height?:** You can chose to use this option or not by selecting **Yes** or **No**. If you select Yes, the Brode 2 Mixing Height Algorithm will be applied. (see Section 3.9 of the SCREEN3 Model User's Guide (EPA 1995a) for more details on this option).

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- **Anemometer Height:** By default an anemometer height of 10 meters is used. However you can choose to specify an alternate anemometer height. This anemometer height will be used to adjust the wind speed to the stack height wind speed for cavity calculations.

Pasquill-Gifford Stability Classes

The Pasquill-Gifford stability classes represent six levels of atmospheric stability. Atmospheric stability is important as it influences the rate of dispersal of pollutants. Increased amounts of turbulence will cause pollutants to disperse more rapidly than with more stable atmospheric conditions. The Pasquill-Gifford stability classes range from A to F (1.0 to 6.0) and describe the ambient atmospheric stability as shown in the table below.

Class	Value	Description
A	1.0	Very unstable
B	2.0	Unstable
C	3.0	Slightly unstable
D	4.0	Neutral
E	5.0	Slightly stable
F	6.0	Stable

Stability classes **A**, **B** and **C** are considered unstable conditions and are associated with enhanced turbulence.

Stability class **D** is referred to as neutral conditions and is associated with mechanically generated turbulence or overcast conditions.

Stability classes **E** and **F** are considered stable conditions are associated with suppressed turbulence.

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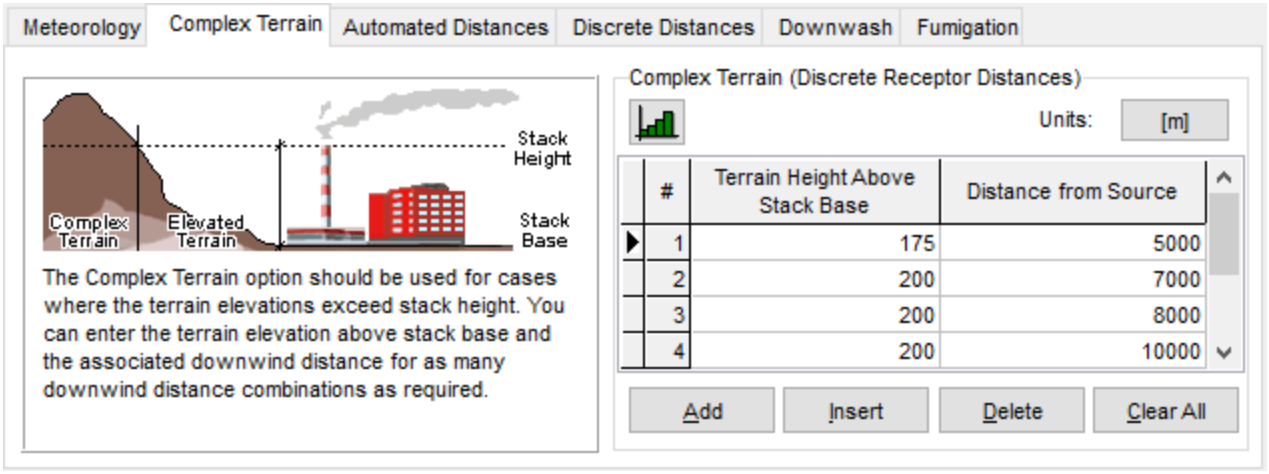
Options - Complex Terrain

The **Complex Terrain** tab is available only for **Point** and **Flare** sources, and if you have selected **Complex Terrain** or **Complex + Simple Terrain** option in the Summary Panel.



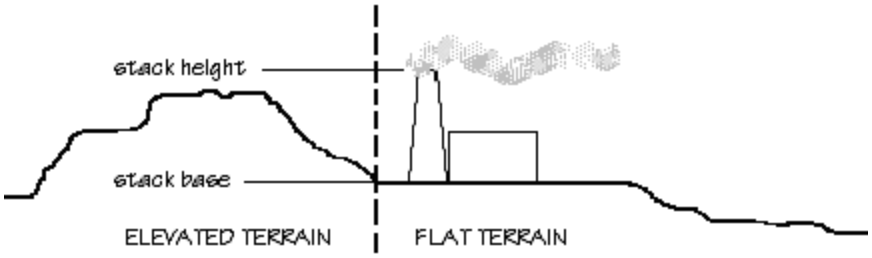
Options window - Complex Terrain tab

The following parameters must be specified in this tab:

- **Terrain Height Above Stack Base:** Specify here the height from stack base to the terrain.
- **Distance from Source:** Specify here the downwind distance for the nearest terrain feature likely to experience plume impaction, taking into account complex terrain closer than the distance to final rise.

Once you have specified the terrain heights, click the button to view the terrain that you have specified in the Terrain Height Viewer.

You can input as many terrain height/distance as necessary.



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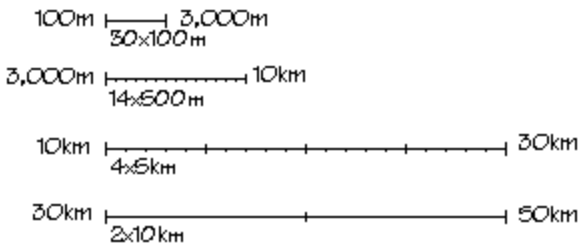
The Meteorology option is not available with Complex Terrain. For the Complex Terrain option, SCREEN automatically uses stability class F (E for urban dispersion coefficients) and a wind speed of 2.5 m/s.

SCREEN uses a receptor height above ground of 0.0m (i.e. no flagpole receptors) in the complex terrain option even if a non-zero value is entered. The original receptor height is saved for later calculations.

Options - Automated Distances

The **Automated Distances** tab is available to you when you check the **Automated Distances** box in the Summary Panel. This option is available only if you are modeling with Simple Terrain.

The **Automated Distances** option gives you the option of using a pre-selected array of 50 distances ranging from 100 m out to 50,000 m (50 km) using the following increments:



For the **Automated Distances** option, the SCREEN model calculates the maximum concentration across a range of meteorological conditions for the minimum distance given. SCREEN then computes the concentration for each distance in the array larger than the minimum and less than or equal to the maximum. SCREEN also uses an iteration routine to determine the maximum value associated with that distance to the nearest meter.

The options available in the **Automated Distances** tab vary depending on whether you have selected **Flat Terrain** or **Elevated Terrain** from the Summary Panel.

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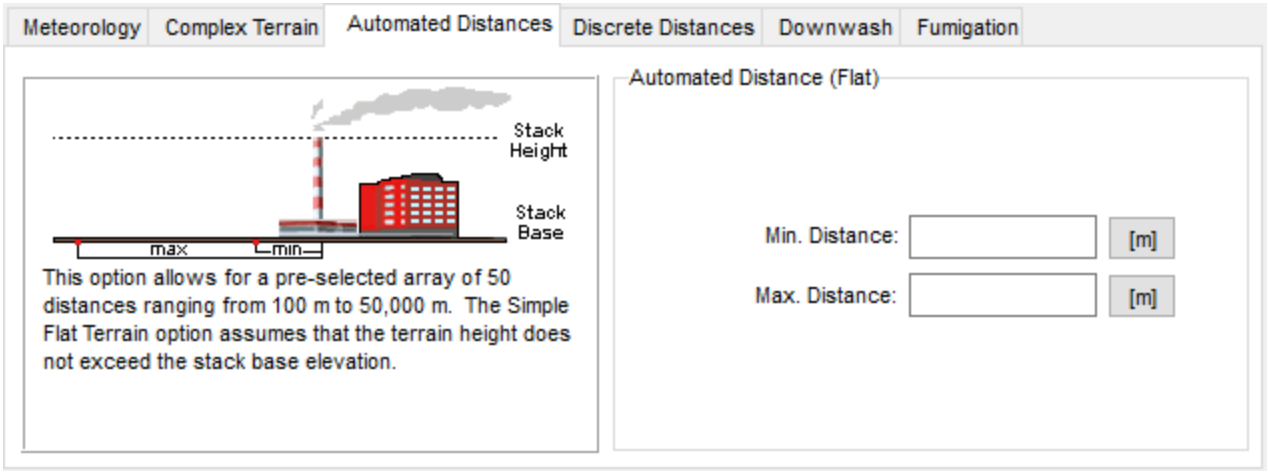
Automated Distances Tab - Flat Terrain



Options window - Automated Distance tab - Flat Terrain

- **Min. Distance:** For most applications, this distance should correspond to the minimum distance to the plant boundary or fenceline. The smallest value allowed is 1.0 meter, for **Area** sources is 0.0 meter, and the maximum 50,000 meters (50 km). The user can input the minimum site boundary distance as the minimum distance for calculation and obtain a concentration estimate at the site boundary and beyond, while ignoring distances less than the site boundary.

- **Max. Distance:** This value should be large enough to ensure that the maximum concentration beyond the fenceline is determined. The smallest value allowed is 1.0 meter, for **Area** sources is 0.0 meter, and the largest value allowed is 50,000 meters (50 km). SCREEN View will make sure you do not enter values outside this range and that the maximum distance value be always greater than the minimum distance value. It is recommended that the maximum distance be set sufficiently large initially to ensure that the maximum concentration is found. This distance will depend on the source, however, the user can input a distance of 50,000 m (50 km) to examine the entire array.

For **Area** sources, distances are measured from the center of the rectangular area. Any value for the minimum distance can be given since concentrations within the area source can be estimated.

For **Volume** sources, concentrations within the volume source cannot be estimated. The SCREEN model will give a concentration of zero for distances, measured from the center of the volume, of less than 2.15 syo (syo=initial lateral dimension).

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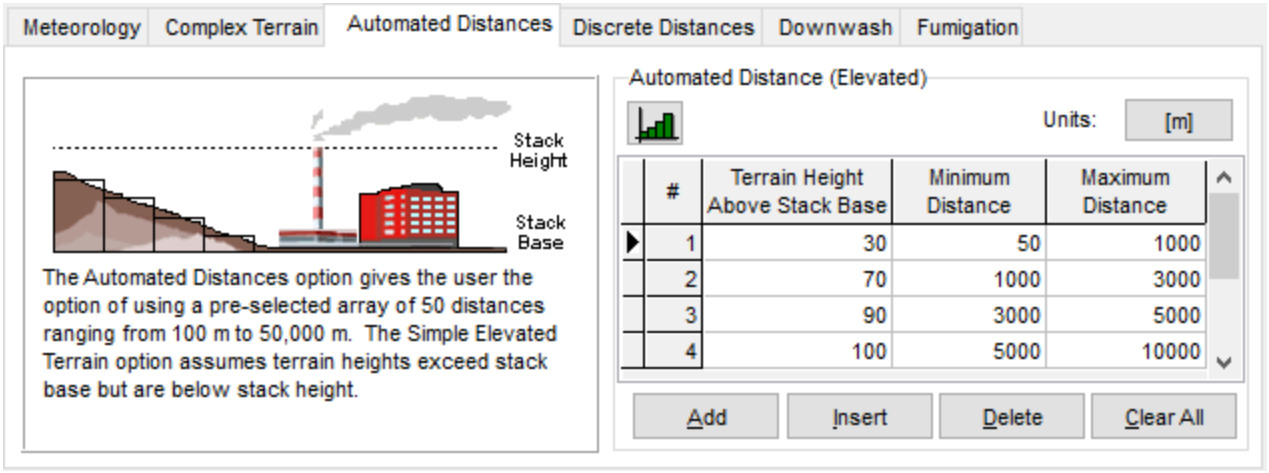
Automated Distances tab - Elevated Terrain



Options window - Automated Distance tab - Elevated Terrain

- **Terrain Height Above Stack Base:** This is the height of the terrain above the stack base. This value should always be smaller or equal to the effective stack height. SCREEN View will alert you if the height you enter is not in a valid range.

- **Minimum Distance:** For most applications, this distance should correspond to the minimum distance to the plant boundary or fenceline. The smallest value allowed is 1.0 m. The user can input the minimum site boundary distance as the minimum distance for calculation and obtain a concentration estimate at the site boundary and beyond, while ignoring distances less than the site boundary.

- **Maximum Distance:** This value should be large enough to ensure that the maximum concentration beyond the fenceline is determined. The smallest value allowed is 1.0 m and the largest value allowed is 50,000 m (50 km). SCREEN View will make sure you do not enter values outside this range and that the maximum distance value you entered is greater than the minimum distance value. It is recommended that the maximum distance be set sufficiently large initially to ensure that the maximum concentration is found. This distance will depend on the source, however, you can input a distance of 50,000 m (50 km) to examine the entire array.

Once you have specified the automated distances, click the button to view the automated distances that you have specified in the Terrain Height Viewer.

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Options - Discrete Distances

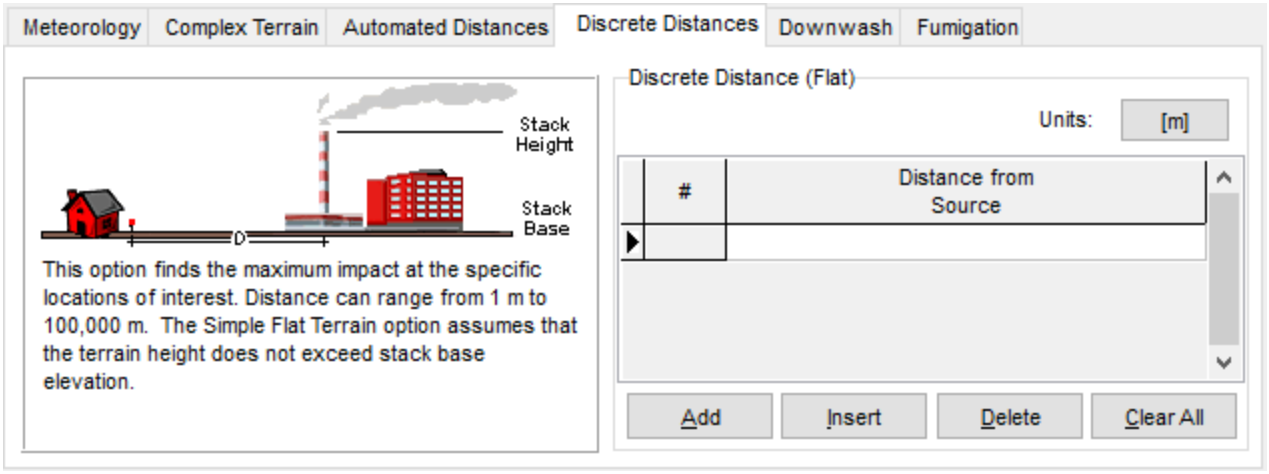
The **Discrete Distances** tab is available to you when you check the **Discrete Distances** box in the Summary Panel. You can model with the **Discrete Distances** option only if you are using Simple Terrain.

The **Discrete Distances** option allows you to find the maximum impact at specific locations of interest, such as nearby residences, hospitals, or schools, and may also be used for long-range transport estimates out to 100 km. Any number of distances can be input and the maximum concentration for each distance will be calculated.

The options available in the **Discrete Distances** tab vary depending on whether you have selected **Flat Terrain** or **Elevated Terrain** from the Summary Panel.

> SCREEN3 model can accept a maximum of 50 discrete distances.

Discrete Distances Tab - Flat Terrain



Options window - Discrete Distance tab - Flat Terrain

- **Distance from Source:** The smallest value allowed is 1.0 m, for **Area** sources is 0.0 m, and the maximum value is 100,000 m (100 km).

> The SCREEN3 model will accepts distances out to 100 km for long-range transport estimates. However, for distances greater than 50 km, SCREEN3 sets the minimum 10-meter wind speed at 2 m/s to avoid unrealistic transport times. (EPA 1995b)

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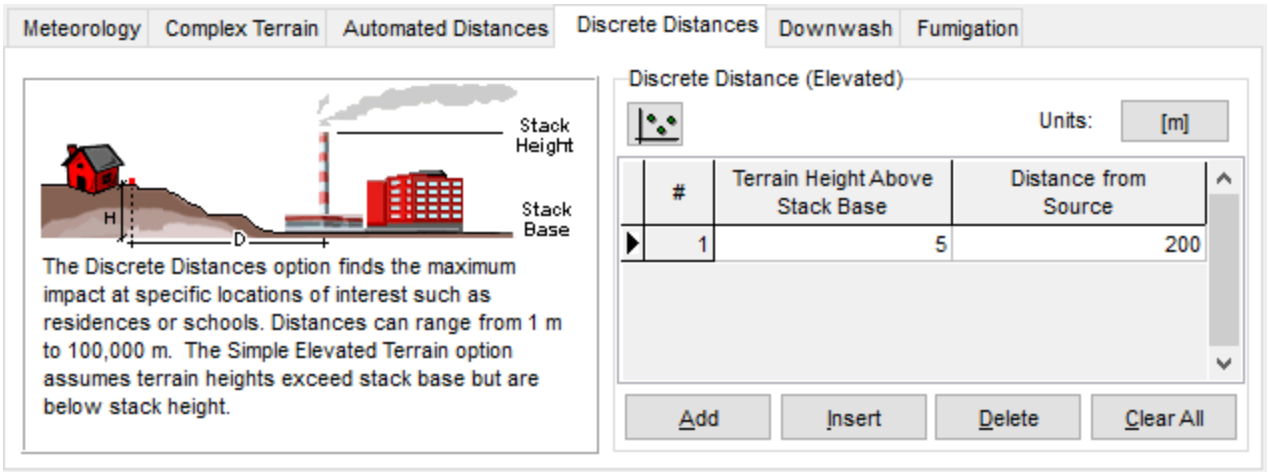
For **Area** sources, distances are measured from the center of the rectangular area. Any value for the minimum distance can be given since concentrations within the area source can be estimated.

Discrete Distances Tab - Elevated Terrain



Options window - Discrete Distance tab - Elevated Terrain

- **Terrain Height Above Stack Base:** This is the height of the terrain above stack base. This value should be always smaller or equal to the effective stack height. SCREEN View will alert you if the height you enter is in a valid range.
- **Distance from Source:** The smallest value allowed is 1.0 m and the maximum value is 100,000 m (100 km). SCREEN View will make sure you do not enter values outside this range.

Once you have specified the discrete distances, click the button to view the discrete distances that you have specified in the Terrain Height Viewer.

Options - Downwash

The **Downwash** tab is available to you when you check the Building Downwash box in the Summary Panel. This option is only applicable to Point and Flare source types. Downwash occurs when the aerodynamic turbulence induced by nearby buildings cause a pollutant emitted from an elevated

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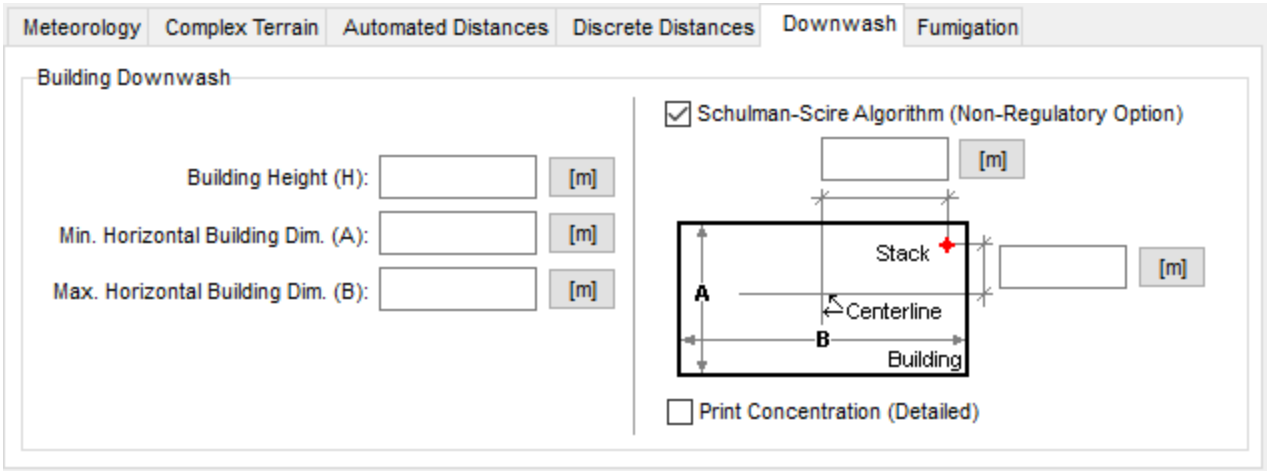
source to be mixed rapidly toward the ground (downwash), resulting in higher ground-level concentrations.

> See Downwash Screening Procedure for information on building downwash screening procedure.



Options window - Downwash tab

The following parameters must be entered in this tab:

- **Building Height (H):** Enter height of the building structure.
- **Min. Horiz Bldg Dim (A):** Enter minimum horizontal building dimension.
- **Max. Horiz Bldg Dim (B):** Enter maximum horizontal building dimension.

To use the **Schulman-Scire Algorithm (Non-Regulatory Option)**, check the box. You must then specify the position of the source on the building, with respect to the A and B building dimension values. More information about the Schulman-Scire Algorithm can be found in the Section 3.9.3 of the SCREEN3 Model User's Guide (EPA 1995a).

For **Flare** releases, SCREEN assumes the following :

- an effective stack gas exit velocity (Vs) of 20 m/s,
- an effective stack gas exit temperature (Ts) of 1,273 K, and
- an effective stack diameter based on the heat release rate.

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Since building downwash estimates depend on transitional momentum plume rise and transitional buoyant plume rise calculations, the selection of effective stack parameters could influence the estimates. Therefore, building downwash estimates for flare releases should be used with extra caution. (EPA 1995b)

If using Automated Distances or Discrete Distances option, wake effects are included in any calculations made. Cavity calculations are made for two building orientations, first with the minimum horizontal building dimension alongwind, and second with the maximum horizontal dimension alongwind. The cavity calculations are summarized at the end of the distance-dependent calculations (Section 3.6 of the EPA's SCREEN3 User's Guide).

Downwash Screening Procedure

The **Downwash Screening Procedure** assumes that the building can be approximated by a simple rectangular box. The possibility of downwash problems should be investigated when assessing the impact of a source on air quality. If downwash can be a potential problem, its effect on air quality should be estimated (EPA 1995c).

The building downwash screening procedure is divided into two major areas of concern:

- **Cavity Region:** Cavity calculations are based on the determination of a critical (i.e., minimum) wind speed required to cause entrainment of the plume in the cavity (defined as being when the plume centerline height equals the cavity height). Cavity calculations are performed for two orientations, first using minimum horizontal dimension alongwind, and second using the maximum horizontal dimension alongwind. The Screen3 model outputs the following:
    - cavity concentration,
    - cavity length (measured from the lee side of the building),
    - cavity height, and
    - critical wind speed for each orientation.

  The highest concentration value that potentially affects ambient air should be used as the maximum 1-hour cavity concentration for the source.

- **Wake Region:** The calculations for the building wake region are based on the ISC model (EPA 1995d). The wake effects are divided into two regions:
    - "near wake" that extends from 3Lb to 10Lb (Lb is the lesser of the building height (hb), and maximum projected width), and
    - "far wake" for distances greater than 10Lb.

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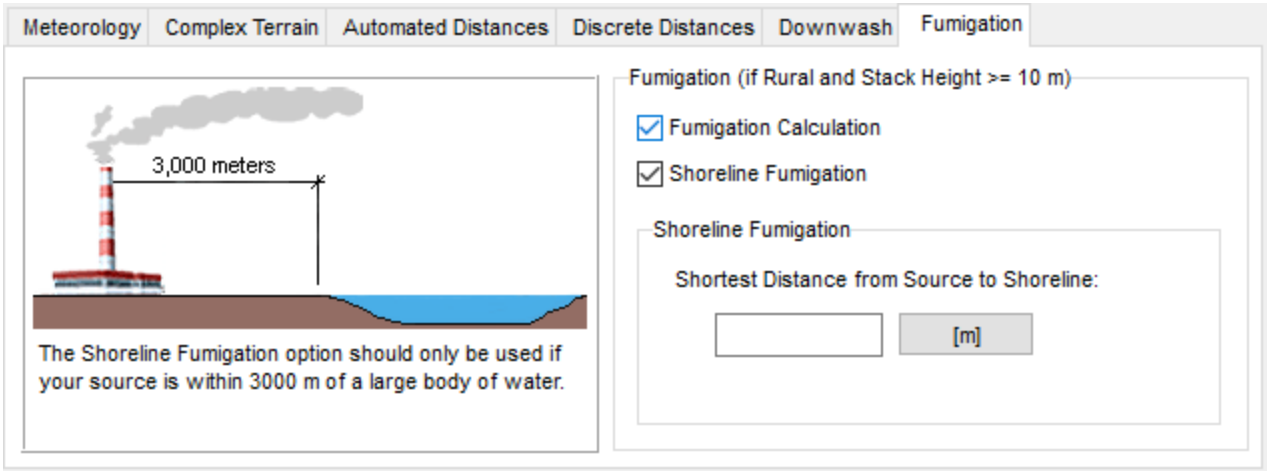
This model calculates the maximum projected width from the values input for the minimum and maximum horizontal dimensions.

Options - Fumigation

The **Fumigation** tab becomes available when you checked the box for the **Fumigation** option in the Summary Panel.

The **Fumigation** option is available only for **Point** and **Flare** sources if:

- the stack height is >= 10 meters, and
- the rural dispersion coefficient was selected



Options window - Fumigation tab

For **Flare** type source, SCREEN3 requires that the effective flare release height be greater or equal to 10 meters. Please see Effective Release Height - Flare for more information on how to calculate it.

Fumigation occurs when a plume that was originally emitted into a stable layer is mixed rapidly to ground-level when unstable air below the plume reaches plume level.

The following option can be specified in the **Fumigation** tab:

- **Shoreline Fumigation:** The Shoreline Fumigation option is only applicable if the source is within 3,000 m onshore from a large body of water. In this case, in addition to the maximum inversion break-up fumigation concentration and distance, maximum concentrations and distance to the maximum associated with shoreline fumigation will be also available in the output file.

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If **Shoreline Fumigation** option is not selected, only the inversion break-up fumigation calculations are done. No further inputs are needed, and the maximum inversion break-up fumigation concentration and distance will be available in the output file.

If the Shoreline Fumigation option is checked, then you will need to input the nearest distance from source to the shoreline in meters.

> The fumigation algorithm ignores any potential effects of elevated terrain. Sources located within 3km of a large body of water should be evaluated for shoreline fumigation.

Effective Release Height - Flare

The effective release height is an equivalent release height that depends on the flare stack height and the total heat release rate and is calculated by the formula below:

$H_{s1} = H_s + (4.56x10\text{-}3) * ((H_r/4.1868)0.478)\ (m)$

where:

H_{s1} = effective flare height (m)

H_s = stack height above ground (m)

H_r = net heat release rate (J/s)

The net heat release rate is calculated as follows:

$$H_r = 44.64 \bullet V \bullet \sum_{i-1}^{n} f_i H_i (1 - F_i)$$

where:

V = volumetric Flow rate to the flare (m3/s)

f_i = volume fraction of each gas component

H_i = net heating vlue of each component (J/g-mole)

F_i = fraction of radiative heat loss

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Run and Output

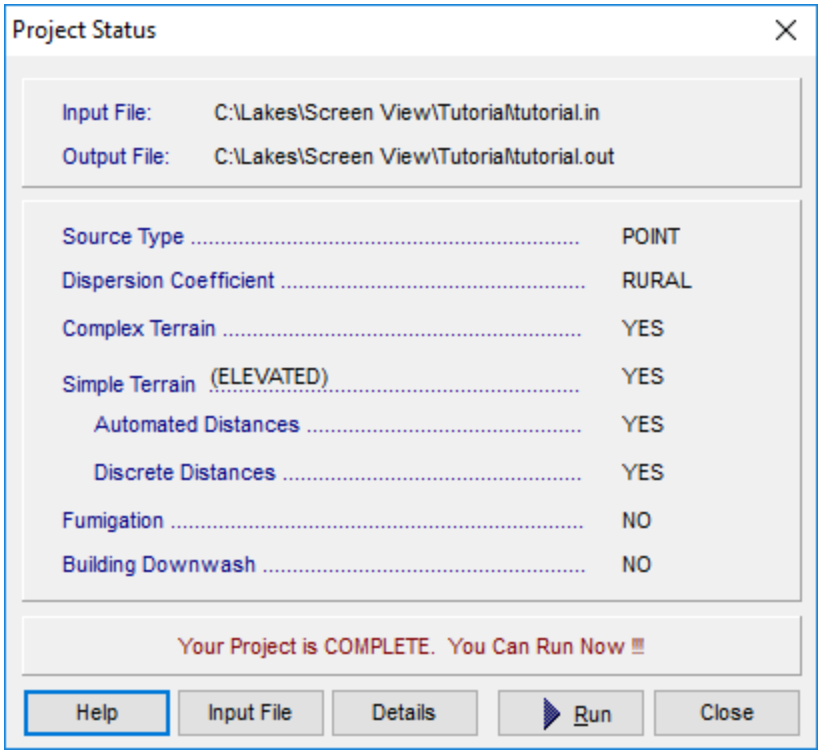
Project Status

The **Project Status** dialog provides you with summary of all the options selected for your SCREEN View run.

You have access to the **Project Status** dialog by selecting **Run | Run SCREEN3**... from the menu, by pressing the

button or by clicking on the

button in the Fumigation tab. The **Project Status** dialog is displayed:



Project Status dialog

This dialog contains a summary of the inputs and options selected for the current project. The following information is displayed in the Project Status dialog:

- The top panel displays the name and path of the SCREEN3 input file (*.in) and output file (*.out).
- The second panel displays a summary of the parameters you defined for the current project. These parameters are:

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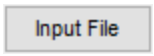
- Source Type
- Dispersion Coefficient
- Complex Terrain
- Simple Terrain
- Automated Distances
- Discrete Distances
- Fumigation
- Building Downwash

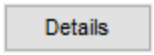
- On the bottom panel of the dialog, a message identifies if your project is complete or not. If your project is incomplete, you should go to the Details dialog to discern the missing information. If the project is complete, you can Run it.

- The following buttons are available in the Project Status dialog:

Displays the Help contents for the **Project Status** dialog.



Click this button to view the Input file in a text editor.

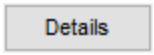


Displays the **Details** dialog.

Click this button to **Run** the SCREEN3 model.

Closes the **Project Status** dialog.

Details

The **Details** dialog is displayed by selecting **Run | Details...** from the menu, or by pressing the 

button from the Project Status dialog.

The **Details** dialog contains a list of all missing information for the current project. The list is subdivided into pathways, with all the missing inputs for each pathway listed under each pathway heading.

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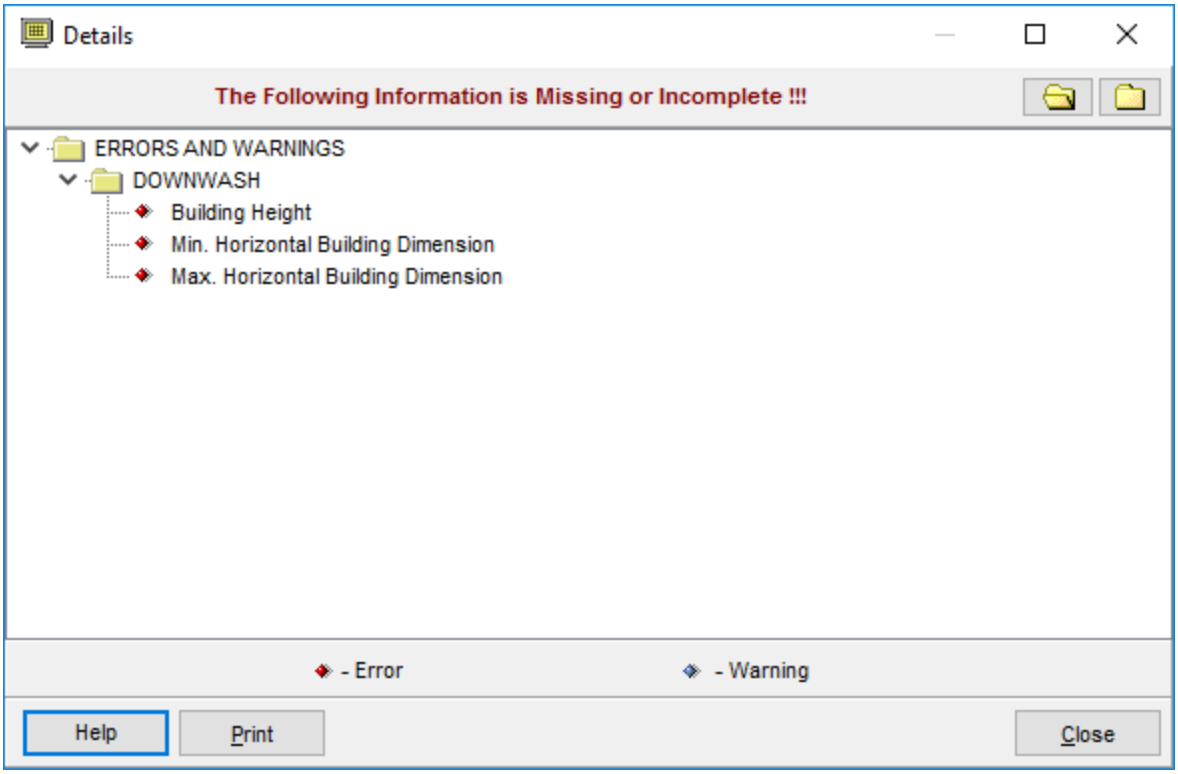
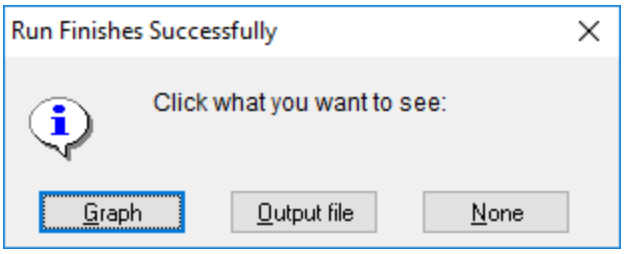


Details dialog

Run

If there is no information missing from your project, clicking the Run button will launch the SCREEN3 run. After the run is finished, the following message will be displayed:



Run Finished Successfully message

From this message you can view the results as a Graph by clicking the Graph button, or as a text file in the default text editor by clicking the Output file button. You can also close this message without viewing the results at all by clicking None.

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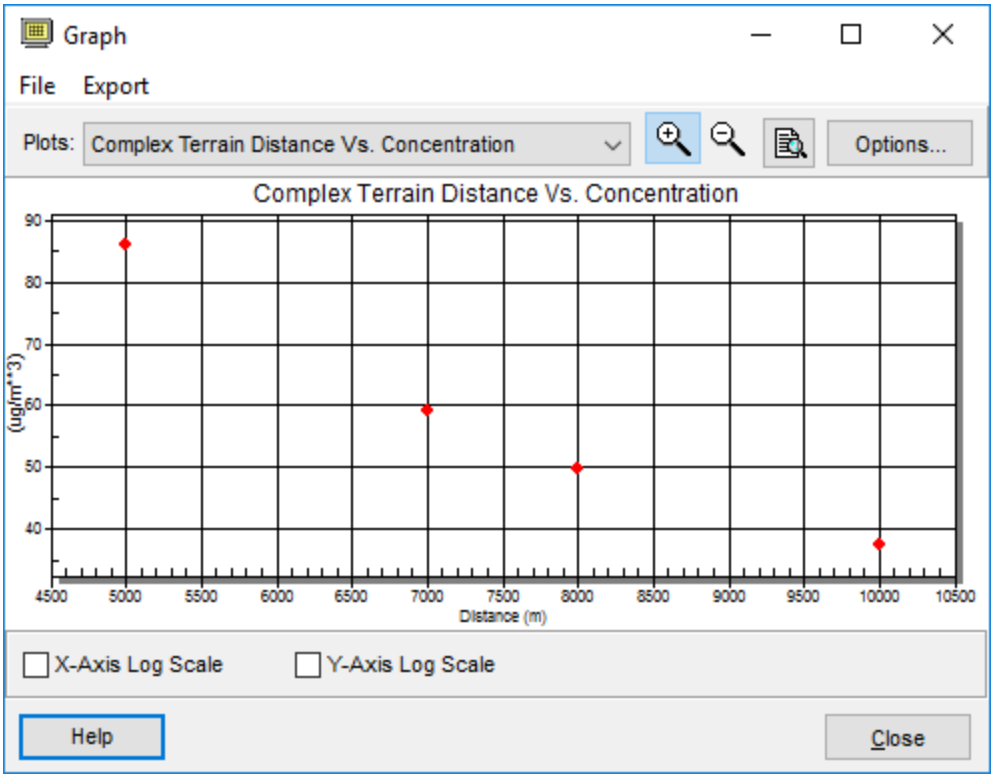
Graph

Graph Dialog

After you run your project, SCREEN View generates a XY plot for each met condition showing the maximum concentration along the footprint center line [ppm] versus the downwind distance [m], using the output file generated by the SCREEN. If your project runs successfully, you have access to the Graph dialog and can view this plot. The **Graph** dialog is displayed when you click on the **Graph** button located on the Menu Toolbar or by selecting **Output | Graph...** from the menu.



Graph dialog

The **Graph** dialog offers you many options to edit your graph and enhance the appearance of the plots generated from the SCREEN Viewoutput file. These options are described below:

- **File:** Displays the following submenu options-
  - **Open...:** Displays **Select Screen Output File** dialog, which allows you to select the desired file.
  - **Print...:** Displays the **Print** dialog, allowing you to print the plot that is currently displayed.
  - **Close:** Closes the **Graph** dialog.
- **Export:** Displays the following submenu options-

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  - **Copy to File:** Displays the following submenu options -
    - **Bitmap.....:** Displays the **Save As** dialog, allowing you to save your graph as a Windows bitmap.
    - **Metafile...:** Displays the **Save As** dialog, allowing you to save your graph as a Windows metafile.
  - **Copy to Clipboard:** Displays the following submenu options -
    - **Bitmap...:** Copies your graph to the clipboard, allowing you to paste it into another windows application as a bitmap.
    - **Metafile...:** Copies your graph to the clipboard, allowing you to paste it into another windows application as a metafile.

- **Plot Title:** A list of available plots for the current project is displayed on the drop-down list. SCREEN View generates a plot for each met condition you specified. To display the plot on the screen, select one of the available plots from the list.
- **Zoom Button** ( ): You can use the **Zoom** button to zoom in on any XY Plot graph display to obtain precise numerical data. Move the cursor into the drawing area, holding down the mouse left button, drag up or down on a diagonal until you cover the area you want to magnify, and release the mouse left button. The graph display is automatically updated.
- **Unzoom Button** ( ): Select the **Unzoom** button to return to the original graph display.
- **Output Preview** ( ): Click this button to display the output file in a text editor. The default editor may be changed in Preferences - System Editor of SCREEN View.
- **Options:** This button opens the Graph Options dialog, which allows you to select various display options for your graph. You can also enhance the appearance of your graph by clicking the right mouse button anywhere within the graph and choosing available Graph Menu Options.
- **X-Axis Log Scale:** Check this option to view your plot with an X-Axis log scale.
- **Y-Axis Log Scale:** Check this option to view your plot with an Y-Axis log scale.

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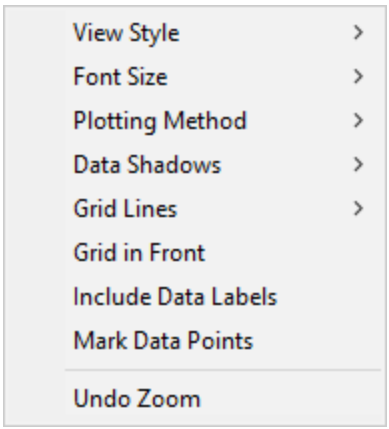
Graph Menu Options

Using the mouse, click the right mouse button anywhere within the graph. The following menu appears:



- **View Style:** Adjusts the graph image to best suit printing on a monochrome or color printer. You can choose from Color, Monochrome, or Monochrome + Symbol. The default is Color. If you wish to print in color, choose the Color option from the adjoining list. If you wish to print in monochrome (black and white), choose Monochrome for graphs with less than four subsets, and choose Monochrome + Symbols for graphs with more than four subsets.
- **Font Size:** Adjusts the size of the graph image fonts for screen display and printing. You can choose from Large, Medium, or Small. The default is Medium. You should select either Medium or Small fonts when printing. For some graphs (i.e. generating an image for a highly rectangular graph), the font size may be automatically reduced in order to produce a higher quality image.
- **Plotting Method:** Sets the primary plot method of the graph. You can choose from one of 10 methods: Point, Line, Bar, Area, Stick, Points + Best Fit Line, Points + Best Fit Curve, Points + Line, Points + Spline, or Spline. The default is Line.
- **Data Shadows:** Toggles between drawing a black shadow behind the bars, points, and areas of a graph using a corresponding plotting method to produce a 3-D effect and no shadow. The default is shadow. The **Data Shadow** option has no effect on certain **Plotting Methods**, such as Line.
- **Grid Lines:** Displays graph grid lines. You can choose from Both X and Y Axes, Y Axis, X Axis, or No Grid. The default is Both X and Y Axes.
- **Grid In Front:** Toggles between drawing the graph grid lines on top of or behind the plotting method graphics and data points. The default is behind. If you choose to display no grid lines from the **Grid Lines** option, this option has no effect.
- **Include Data Labels:** Toggles whether or not the data labels are displayed on the graph. The default is not labeled. If you choose a **Bar Plotting Method**, this option has no effect.

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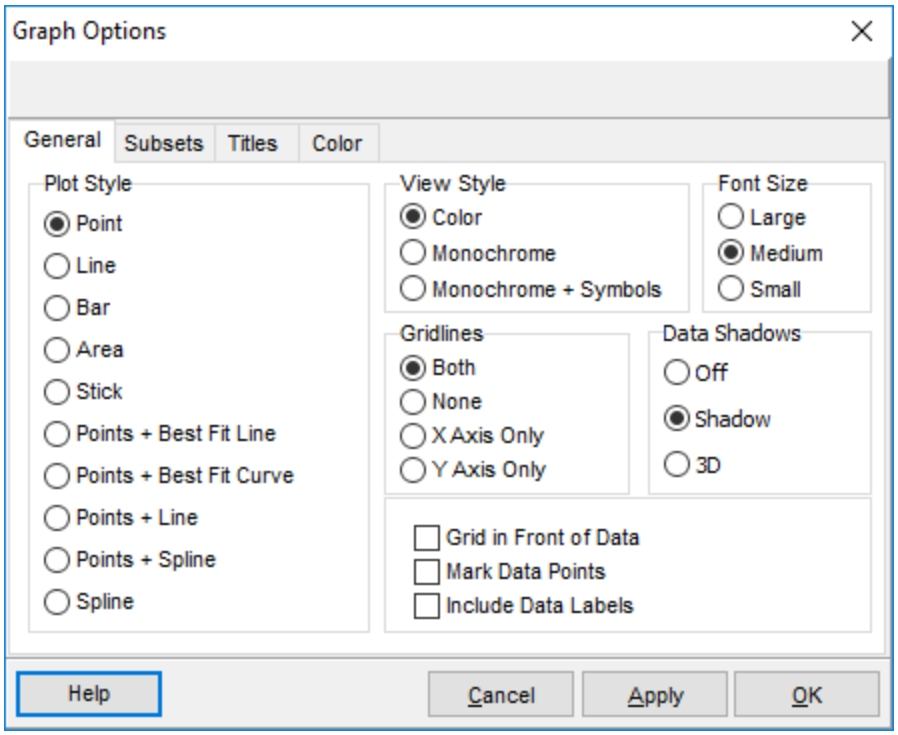
- **Mark Data Points:** Toggles whether each data point on the graph is displayed on the graph with a dot or is not displayed. The default is not marked. If you choose a **Bar Plotting Method**, this option has no effect.

- **Undo Zoom:** Returns the graph area to its original view.

Graph Options

The **Graph Options** dialog contains options to set various graph attributes, such as all general settings, plot styles, subset display, points settings, axis settings, font settings and display, and color settings.



Graph Options dialog

The **Graph Options** dialog can be accessed in any one of the following ways:

- Double-click the mouse anywhere within the graph display; or

- Click on the Options... button in the **Graph** dialog

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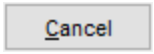
The **Graph Options** dialog has four tabs:

- General
- Subsets
- Titles
- Color

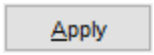
Button Guide

At the bottom of the **Graph Options** dialog are a series of buttons. Their functions are described below:

Displays the Help for the **Graph Options** dialog.



Exits the **Graph Options** dialog without implementing any changes to the graph.



Implements changes made to the graph but does not close the **Graph Options** dialog.

Implements changes made to the graph and closes the **Graph Options** dialog.

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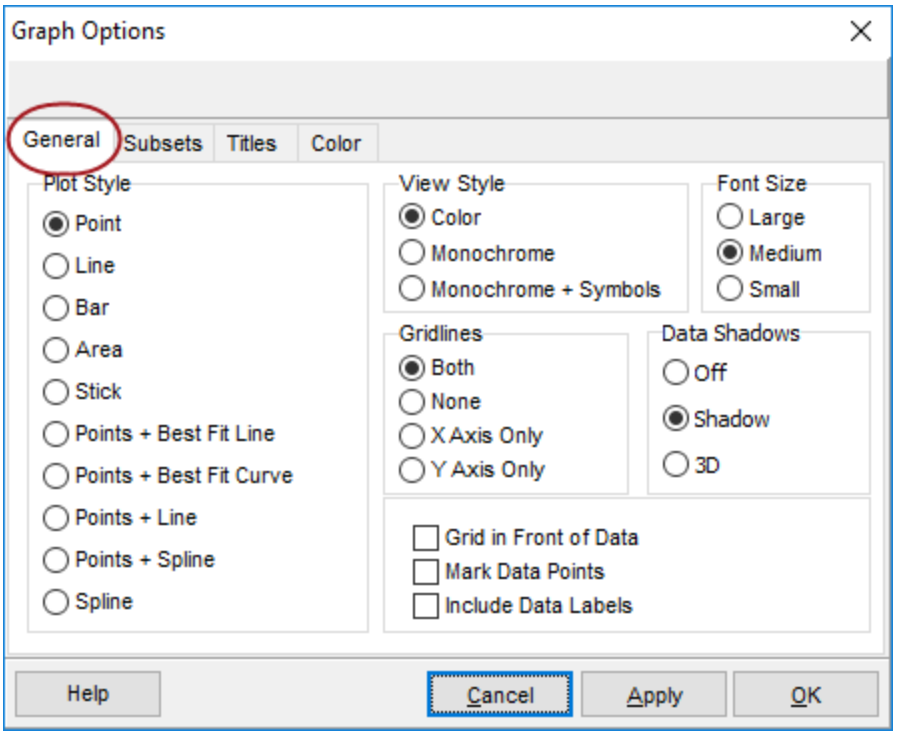
Graph Options - General

In the **General** tab of the Graph Options dialog, you define basic graph attributes and settings such as graph titles, viewing style, font size, grid lines, etc.



Graph Options dialog - General tab

The following options are available in this tab:

- **Plot Style:** Sets the primary plot method of the graph. You can choose from one of 10 methods: **Point**, **Line**, **Bar**, **Area**, **Stick**, **Points + Best Fit Line**, **Points + Best Fit Curve**, **Points + Line**, **Points + Spline**, or **Spline**. The default is **Line**.

- **View Style:** Adjusts the graph image to best suit printing on a monochrome or color printer. You can choose from **Color**, **Monochrome**, or **Monochrome + Symbol**. The default is **Color**. If you wish to print in color, choose the **Color** option from the adjoining list. If you wish to print in monochrome (black and white), choose **Monochrome** for graphs with less than four subsets, and choose **Monochrome + Symbols** for graphs with more than four subsets.

- **Font Size:** Adjusts the size of the graph image fonts for screen display and printing. You can choose from **Large**, **Medium**, or **Small**. The default is **Medium**. You should select either **Medium** or **Small** fonts when printing. For some graphs (i.e. generating an image for a highly rectangular graph), the font size may be automatically reduced in order to produce a higher quality image.

- **Gridlines:** Displays graph grid lines. You can choose from **Both**, **None**, **X Axis Only**, and **Y Axis Only**. The default is to display both gridlines.

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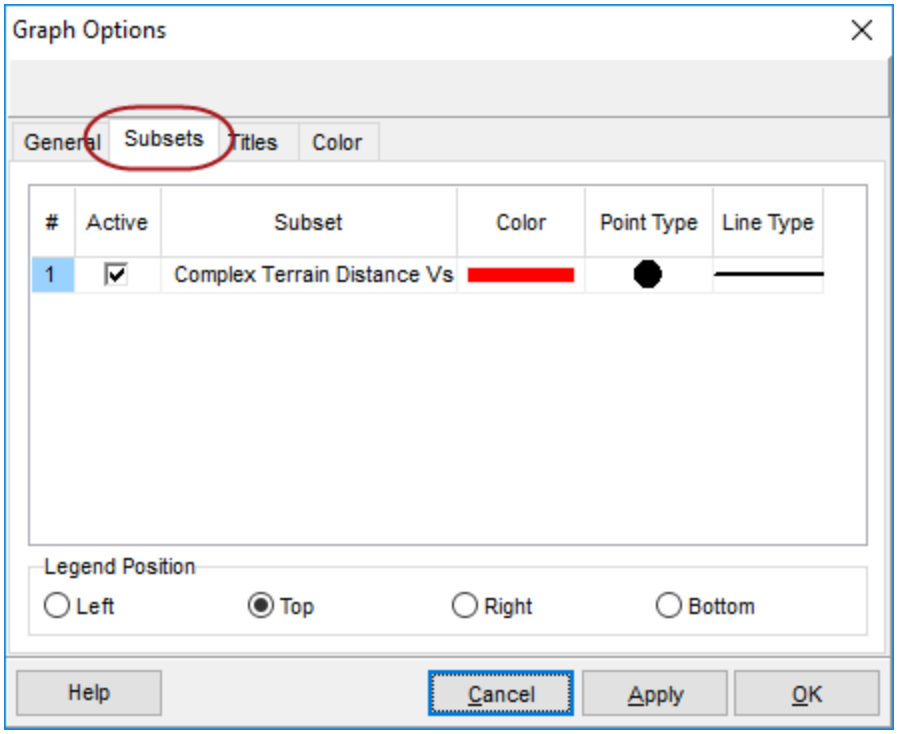
- **Data Shadows:** Toggles between drawing a black shadow behind the bars, points, and areas of a graph using a corresponding plotting method to produce a 3-D effect and no shadow. The default is shadow. The **Data Shadow** option has no effect on certain plot styles, such as Line.
- **Grid in Front of Data:** Toggles between drawing the graph grid lines on top of or behind the plotting method graphics and data points. The default is behind. If you choose to display no grid lines from the **Grid Lines** option, this option has no effect.
- **Mark Data Points:** Toggles whether each data point on the graph is displayed on the graph with a dot or is not displayed. The default is not marked. If you choose the **Bar Plot Style**, this option has no effect.
- **Include Data Labels:** Toggles whether or not the data labels are displayed on the graph. The default is not labeled. If you choose the **Bar Plot Style**, this option has no effect.

Graph Options - Subsets

In the **Subsets** tab of the Graph Options dialog, you can specify viewing options for your subsets.



SCREEN View - Graph Options dialog - Subsets tab

> The options found in the Subsets tab differ slightly between SCREEN View and Meteo View due to the differences in the data being plotted.

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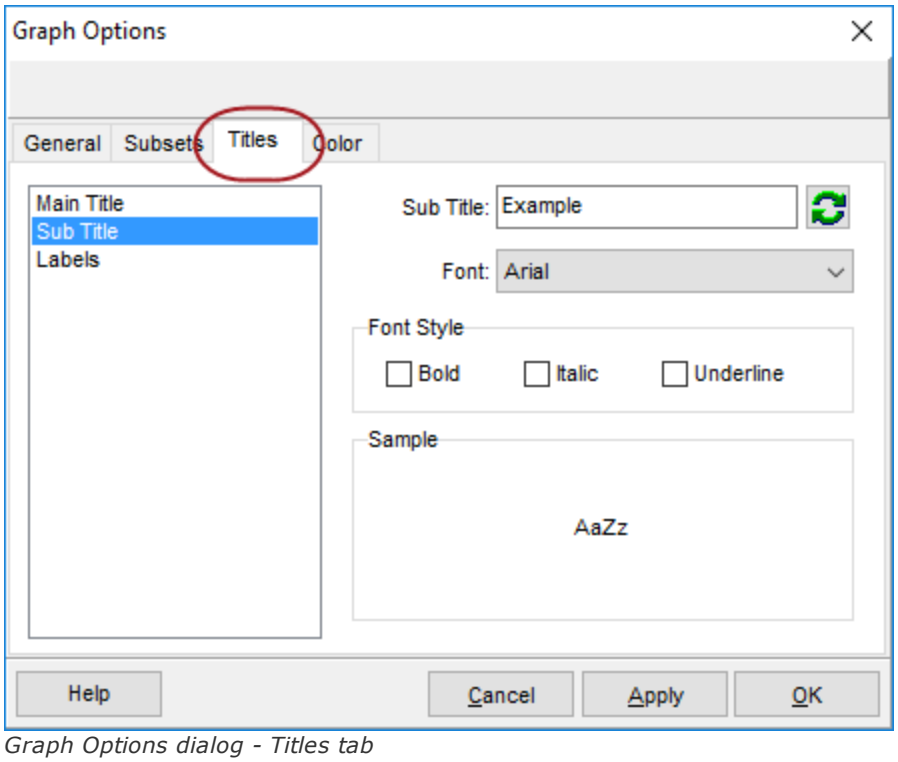
The following options are found:

- **Active:** You can chose to display or hide a series by checking/unchecking the **Active** box.
- **Subset:** Displays the name of the subset.
- **Color:** Change the point and line color by double clicking on the color bar to open the Color dialog where you can select the color of choice.
- **Point Type:** To change the point type, click in their respective cell in the table. A drop-down list appears, allowing you to select from a number of different styles.
- **Line Type:** To change the line type, click in their respective cell in the table. A drop-down list appears, allowing you to select from a number of different styles.
- **Legend Position:** Select where you would like the **Legend** displayed on the graph area.

Graph Options - Titles

The **Titles** tab of the Graph Options dialog allows you to make changes to the title, subtitle, and X and Y axis labels.



Graph Options dialog - Titles tab

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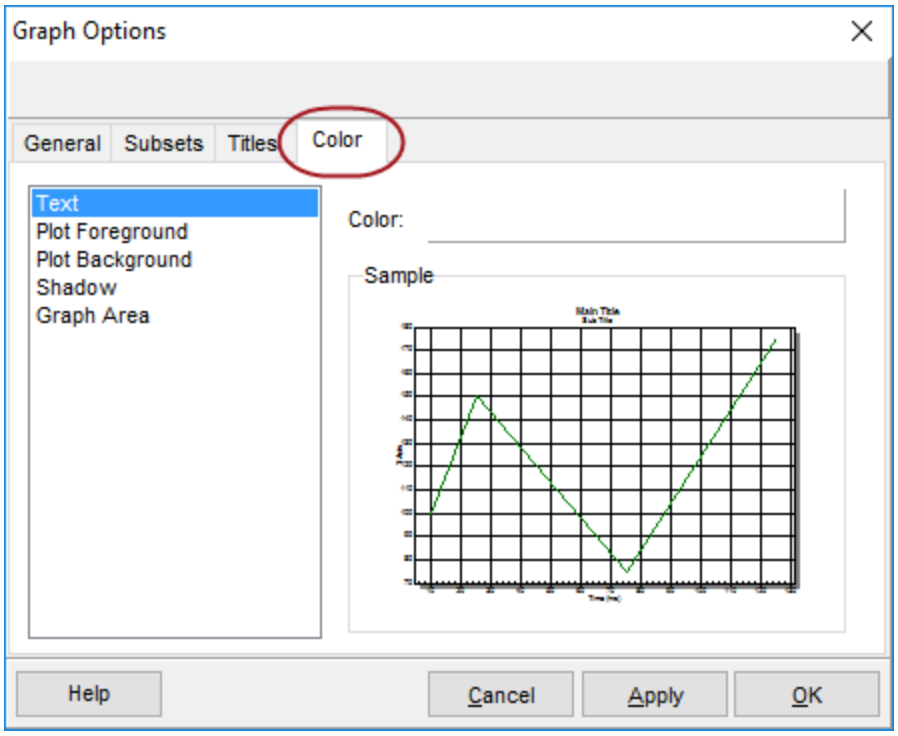
The following options are available:

- **Title/Label:** Select the title or label you wish to change from the panel on the left. The default Title/Label will be displayed in the box on the right. You can change the title or if you wish to change it back to the default, click on the button.
- **Font:** Select the font for your title/label from the drop-down list.
- **Font Style:** Select the font style for your title/label. You may apply or remove bold, italics and/or underline characteristics.
- **Sample:** Displays a sample of the font and styles you have selected.

Graph Options - Color

The **Color** tab of the Graph Options dialog allows you to change the color of graph objects.



Graph Options dialog - Color tab

How To Change the Color of a Graph:

1. Select the graph object you wish to change the color of from the list on the left.

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2. Click on the color bar to display the Color dialog where you can select the color of your choice.

3. The change is displayed in the **Sample** panel.

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Technical Support

System Requirements

SCREEN View is a Microsoft® Windows®-based program that can be installed in the following Windows operating systems (32-bit and 64-bit):

- Microsoft Windows 10
- Microsoft Windows 8 & 8.1
- Microsoft Windows 7 (Home Premium, Professional and Ultimate versions)

Technical Support

Freeware products provide the following technical support options:

- Knowledgebase: http://www.weblakes.com/kb/FreewareKB/
- If you would like to report an issue with the software or provide suggestions for new product features, please direct your comments via email: support@weblakes.com.
- We recommend that you visit our web site periodically to check for future updates.

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- Jesse L. Thé, Ph.D., P.Eng.
- Cristiane L. Thé, M.A.Sc.
- Michael A. Johnson, B.Sc.

Our development effort was enormously facilitated by our team members:

- Oleg Shatalov
- Michael Hammer
- Alexandra Torrens

SCREEN View source code, executables, help, and user's guides are the intellectual property of Lakes Environmental Software.

Disclaimer

This document and accompanying software follow the US EPA SCREEN3 model to the best of our understanding. The user is responsible for checking the input data and the results for consistency.

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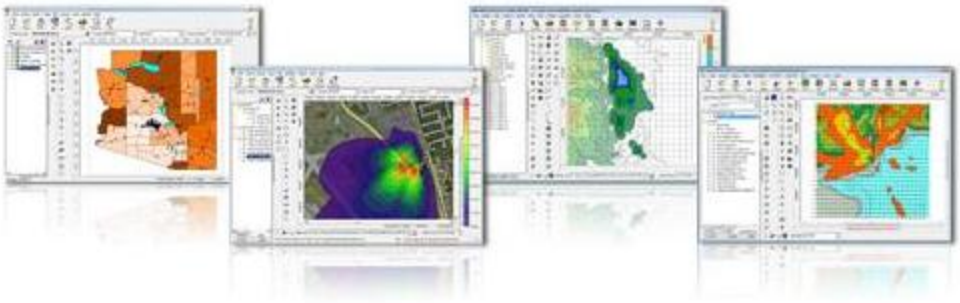
Lakes Environmental Software Products

Lakes Environmental offers a wide range of environmental software products, covering five major categories of air quality.



Click on one of the five categories listed below to see more about how to select the right software for you.

Air Dispersion Modeling

Compliance Assurance

Emergency Release

Emissions Management

Risk Assessment

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2. U.S. Environmental Protection Agency, 1995b. Industrial Source Complex (ISC3) Dispersion Model User's Guide. EPA-454/B-95-003b. U.S. Environmental Protection Agency. Research Triangle Park, NC 27711.

3. U.S. Environmental Protection Agency, 1995c. Guideline On Air Quality Models (Revised), EPA-450/2-78-027R. U.S. Environmental Protection Agency. Research Triangle Park, NC 27711.

4. U.S. Environmental Protection Agency, 1995d. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, EPA-454/R-92-019. U.S. Environmental Protection Agency. Research Triangle Park, NC 27711.

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