United States
Environmental Protection Agency

Office of Chemical Safety
and Pollution Prevention

Getting Started Guide:

Integrated Indoor-Outdoor Air Calculator

2018

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1 Introduction

The EPA Office of Pollution Prevention and Toxics (OPPT) assesses a wide variety of chemical substances that are released to air from facility (stack, incinerator, and fugitive), area soil, and area water sources. In addition to existing chemicals, OPPT must also assess air emissions for new chemical submissions. Site-specific information is often not known when assessing new chemical submissions. For example, location, size, number of stacks, and/or incinerator characteristics may all be unknowns when modeling air concentrations and exposures stemming from facility releases. Therefore, a versatile approach was developed to estimate outdoor and indoor air concentrations, as well as particle deposition, resulting from air releases by distance from the source.

OPPT designed the Integrated Indoor-Outdoor Air Calculator (IIOAC) as a user-friendly Excel-based tool that estimates indoor and outdoor air concentrations, as well as particle deposition, by distance, from chemical releases to air. IIOAC is able to quickly process new and existing chemicals from multiple sources and multiple releases for release and exposure potential. The tool uses pre-run results from a suite of AERMOD dispersion scenarios run in a variety of meteorological and land-use settings. AERMOD is a modeling system comprised of several modeling routines that work together to estimate time-average air concentrations and deposition rates around emissions sources. AERMOD is fully promulgated as a replacement to the Industrial Source Complex (ISC3) Dispersion Models, in accordance with the Revisions to the Guideline on Air Quality Models (US EPA, 2017b). AERMOD is EPA's recommended air dispersion model and has been subject to peer review and model evaluation. IIOAC, based on AERMOD, will over time replace use of Screen3 in E-FAST.

IIOAC allows for different meteorological stations and local land cover, release durations, particle/vapor scenarios, urban/rural settings, and types of sources. Releases may occur through facility (stack, incinerator, and fugitive), area soil, and area water sources. Daily-averaged and annual-averaged air concentrations are used to estimate chemical exposure. IIOAC was developed to process multiple scenarios from multiple sources at once; the tool allows for intermittent releases and variation in meteorological conditions to account for potential variability in exposure conditions. OPPT reviewed available air modeling applications and determined that a tool meeting these needs is not currently available.

This getting started guide is intended to teach the user the basics of how to use IIOAC. A complete User's Guide for IIOAC is also available and provides details on the modeling approaches and input parameters to aid with output interpretation (US EPA, 2018).

2 General Description of IIOAC

While there are a variety of tools to estimate air concentrations resulting from chemical releases, there remains a need for a tool that is able to quickly and simultaneously process

multiple emission scenarios for multiple sources, while allowing for intermittent releases and variation in meteorological conditions. To meet this need, OPPT designed the IIOAC tool.

2.1 General Description

IIOAC is a tool based on AERMOD that assesses the release to air and exposure potential for new and existing chemicals. A key feature of the tool is the grouping of inputs to define emission scenarios. An emission scenario is a collection of releases featuring one or multiple source types, each with different temporal patterns and emission rates. For each emission scenario, the tool provides output summarizing air concentrations, particle deposition, and exposure doses at different receptor distances for each source type. A general overview of the Excel-based tool is illustrated in Figure 1.

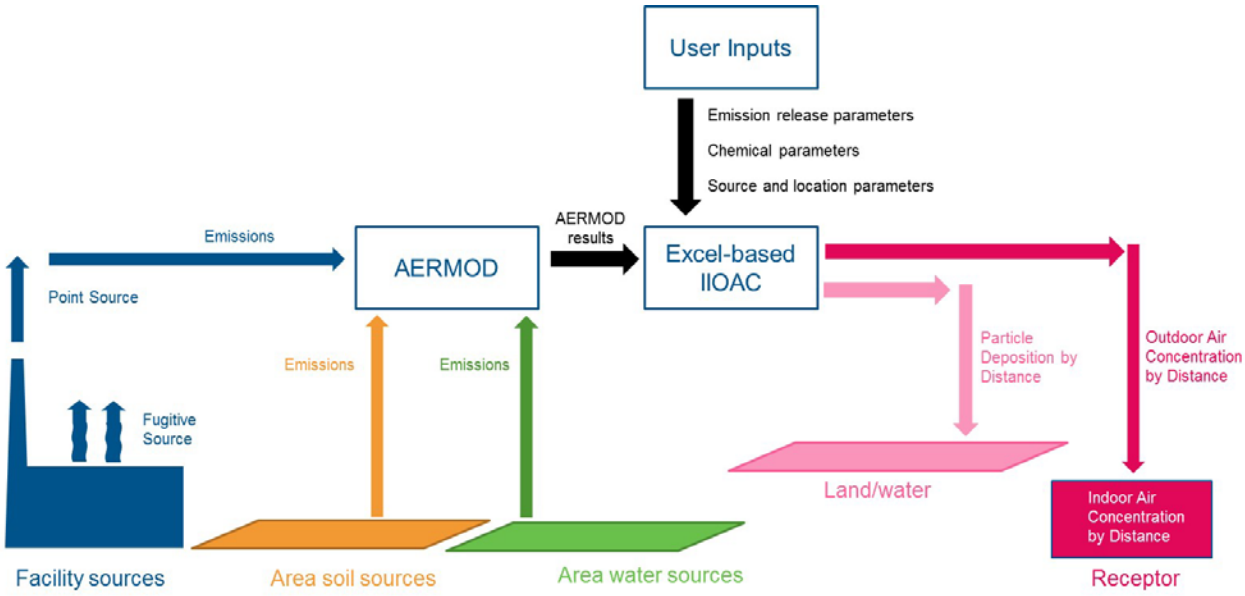

Figure 1. Schematic of the different components of IIOAC.

IIOAC considers releases from the following emission source types:

- Facility sources (point and fugitive) – point sources are defined as stack and incineration releases,
- Area soil sources, and
- Area water sources (batch and continuous-flow systems).

For each source type, a suite of generic AERMOD (version 16216r) runs have been designed and pre-run; the resulting air concentrations and particle depositions were post-processed in R and packaged into lookup tables as part of IIOAC (see Section 3.1 for downloading and operating IIOAC. Note, the zip file needs to be located in the same folder as IIOAC). Running the Excel-based IIOAC involves specifying emission scenario inputs so that the applicable AERMOD run is selected and the associated concentrations and depositions are adjusted to account for the

particular emission rate and if applicable, area size. Three types of user inputs are required to characterize each emission scenario:

- Emission parameters: source type, emission rate, and number of releases per year
- Chemical and system parameters: area source size or chemical-specific parameters, and
- Location parameters: facility parameters, climate region, urban/rural, and particle sizes.

Each of these types are explained in greater detail in Section 2.2.

IIOAC allows these inputs to be either imported via an input file or manually entered. IIOAC is currently designed to allow for up to a maximum of 100 release profiles (i.e., the combination of number of releases per year and the emission rate) per source type. Based on the user inputs, the tool will automatically calculate and display, for each emission scenario and at pre-defined receptor distances, the resulting outdoor and indoor air concentrations; particle deposition to surfaces; and acute and chronic dose at pre-defined life stages. An export feature is available that allows the user inputs and associated outputs to be saved into a separate Excel workbook.

2.2 User Inputs

2.2.1 Emission Parameters

For each site of interest, users have the option to import an Excel data file or manually input information on the emission source type, number of emission scenarios, number of releases per scenario, and for each release, the mass released per day and the number of release days.

Table 1 provides an example of user-defined emission scenarios and release profiles. In the example in Table 1, three types of emission scenarios occur and are given the following names: manufacturing, processing, and use. Multiple source types with multiple releases can occur for each emission scenario. For example, in the Use scenario, there are four different releases from both fugitive and area land sources. IIOAC can process all source types and emission scenarios at once and provide a summary of results as described in Section 0. Note the default release duration is 24 hours for all source types. However, the user has the option of selecting release durations of 1, 4, and 8 hours for point (stack, incinerators) and fugitive sources.

Table 1. Example of multiple emission scenarios entered by user for each site.

Emission Scenario #	Emission Scenario	Source Type	Release #	Mass Released per Day (kg/day)	# of Release Days per Year
1	Manufacturing	Incineration	1	100	5
1	Manufacturing	Fugitive	1	10	100
2	Processing	Incineration	1	50	12
2	Processing	Incineration	2	1	100
2	Processing	Fugitive	1	100	5
2	Processing	Fugitive	2	10	50

2	Processing	Area Water	1	1	250
2	Processing	Area Water	2	1	100
2	Processing	Area Water	3	0.1	250
2	Processing	Area Water	4	0.01	365
3	Use	Fugitive	1	1	5
3	Use	Fugitive	2	0.5	12
3	Use	Fugitive	3	0.25	100
3	Use	Fugitive	4	0.001	365
3	Use	Area Soil	1	100	1
3	Use	Area Soil	2	10	5
3	Use	Area Soil	3	1	12
3	Use	Area Soil	4	0.1	30

2.2.2 Chemical and System Parameters

Depending on the source type selected, the user will also be asked to enter chemical-specific and/or system-specific parameters. All emission scenarios with a given source type use the same system parameters. The following table outlines the required user inputs:

Table 2. Chemical and system-specific parameters required for IIOAC.

User Input	**Symbol**	**Source Type**				
		Point	**Fugitive**	**Soil**	**Water – Batch[a]**	**Water – Continuous flow[b]**
System-specific parameters						
(Surface) Area (m^2)	*A*		✓	✓	✓	✓
Depth of water (m)	*D*				✓	✓
Flowrate (m^3/day)	*Q*					✓
Chemical-specific parameters						
Vapor pressure (Torr)	*VP*			✓	✓	✓
Solubility (mg/L)	*Sol*			✓		
Organic carbon sorption coefficient (mL/g)	K_{oc}			✓		
Volatilization half-life (1/day)	$t_{1/2}$				✓	✓
Molecular weight (g/mol)				✓	✓	✓

[a]: batch water sources are considered to be area water sources with no flow in or out of the system, e.g., lake, surface impoundment for wastewater, open tanks

[b]: continuous flow water sources have a constant flowrate into and out of the system, e.g., river, aeration tank in wastewater treatment process

2.2.3 Location Parameters

For each source type selected, Table 3 lists the location and deposition parameters that must be provided by the user. Further information on each of the inputs is described in Section 5 of the User's Guide.

Default selections for provided in Section 5.7 of the User's Guide.

Table 3. Location parameters required for IIOAC.

User Input	Source Type				
	Point	Fugitive	Soil	Water – Batch[a]	Water – Continuous flow[b]
Urban or rural setting	✓	✓	✓	✓	✓
Particle size or vapor	✓	✓			
Climate region	✓	✓	✓	✓	✓

[a]: batch water sources are considered to be area water sources with no flow in or out of the system, e.g., lake, surface impoundment for wastewater, open tanks

[b]: continuous flow water sources have a constant flowrate into and out of the system, e.g., river, aeration tank in wastewater treatment process

2.3 IIOAC Outputs

The meteorology data used in IIOAC varies hourly throughout the year and results in a wide range of air concentrations for a given set of emission inputs. As a result, for each emission scenario defined by the user, IIOAC will provide output metrics for two groups of receptors: inner ring or "fenceline" ring receptors, and near-facility "community" receptors. A description of these receptor groups, along with the number of receptors for each AERMOD run, are provided in Section 5.6 of the User's Guide.

For each group of receptors, the meteorology data is used to calculate the following parameters:

- Daily-averaged air concentration (i.e., hourly concentrations averaged over one day),
- Annual-averaged air concentration values (i.e., hourly concentrations averaged over one year), and
- Annual-averaged total annual particle deposition (wet and dry) (i.e., hourly deposition averaged over one year).

IIOAC then calculates and reports the central-tendency and high-end values, approximately defined as the average (mean) and 95th percentile, respectively, of all values, of the above three parameters.

While total annual particle deposition (total, wet, dry) is not used further in IIOAC, these results can be used as inputs to models that estimate soil and surface water concentrations.

In addition to air concentrations and particle deposition, the mean and high-end acute and chronic exposure doses are also calculated using the mean and high-end daily- and annual-averaged air concentrations (see Section 11 of the User's Guide). Exposure doses are provided for the following age groups:

- Young toddler (1- <2 years),
- Adult (16- <78 years), and
- Lifetime (0- <78 years) – calculated for chronic exposure doses only.

Table 4 provides an example IIOAC output for one run. Output metrics are calculated for each emission scenario. The stack and incinerator sources are aggregated into one source called point source. For fugitive and area sources, IIOAC outputs are calculated based on the user-specified area size. However, these outputs can be scaled to a different area size if needed, using regression coefficients in Appendix A of the User's Guide.

Table 4. Example IIOAC output. Outputs for stack and incinerators are aggregated into point source. [1]High-end values are defined as the 95th percentile.

Source Type	Emission Scenario	Statistic[1]	Location	Outdoor Air Concentration (µg/m^3)		Indoor Air Concentration (µg/m^3)		Deposition (g/m^2)			Acute Dose (mg/kg/day)		Chronic Dose (mg/kg/day)		
				Daily	Annual	Daily	Annual	Tot	Wet	Dry	Young Toddler	Adult	Young Toddler	Adult	Lifetime
Point	Manufacturing	High-End & Mean	Fenceline												
			Community												
	Processing	High-End & Mean	Fenceline												
			Community												
	Use	High-End & Mean	Fenceline												
			Community												
Fugitive	Manufacturing	High-End & Mean	Fenceline												
			Community												
	Processing	High-End & Mean	Fenceline												
			Community												
	Use	High-End & Mean	Fenceline												
			Community												
Area Water	Manufacturing	High-End & Mean	Fenceline												
			Community												
	Processing	High-End & Mean	Fenceline												
			Community												
	Use	High-End & Mean	Fenceline												
			Community												
Area Soil	Manufacturing	High-End & Mean	Fenceline												
			Community												
	Processing	High-End & Mean	Fenceline												
			Community												
	Use	High-End & Mean	Fenceline												
			Community												
Both High-end and mean values are displayed on the table on different rows															

3 Using IIOAC

3.1 Downloading and Operating IIOAC

To use IIOAC, two files **must be downloaded and saved to the same folder**. These are an Excel file containing the main program file (IIOAC_Locked_v1.0.xlsm), and a "zip" file (i.e., a file format commonly used for compression and transmission of large computer files) of pre-run AERMOD results (IIOAC_RunFiles.zip). **Files from the zip file should not be extracted and should remain within the zip file.** The user will not directly access the zip file; rather, the main program file will call on files within the zip file.

3.2 Hardware and Software Requirements for IIOAC

The hardware and software requirements to run IIOAC are listed below. Note that higher specifications will lead to increased performance and decreased runtime.

Hardware (Windows Vista Business Requirements):

- 1-gigahertz (GHz) 32-bit (x86) processor or 1-GHz 64-bit (x64) processor,
- 1 GB of system memory, and
- 128 MB of graphic memory (minimum).

Software:

- Windows Operating System and
- MS Excel 2010 or greater.

3.3 Overall Organization

After opening the IIOAC, the user will land on the **Introduction Tab**. The user will move through the tool by using the blue navigation buttons at the bottom of each sheet.

Clicking on these navigation buttons will automatically take the user to the next tab until the **Output Tab** is reached.

3.4 Introduction Tab

In IIOAC, the **Introduction Tab** provides a general description of IIOAC and directs the user to choose a source type from the drop-down menu. The available options are: point source (stack

or incineration), fugitive source, area soil source, area water source, and all sources (i.e., more than one type of source). After clicking **Begin**, the user has the option to import an input file or to manually enter scenario and release data (Figure 2).

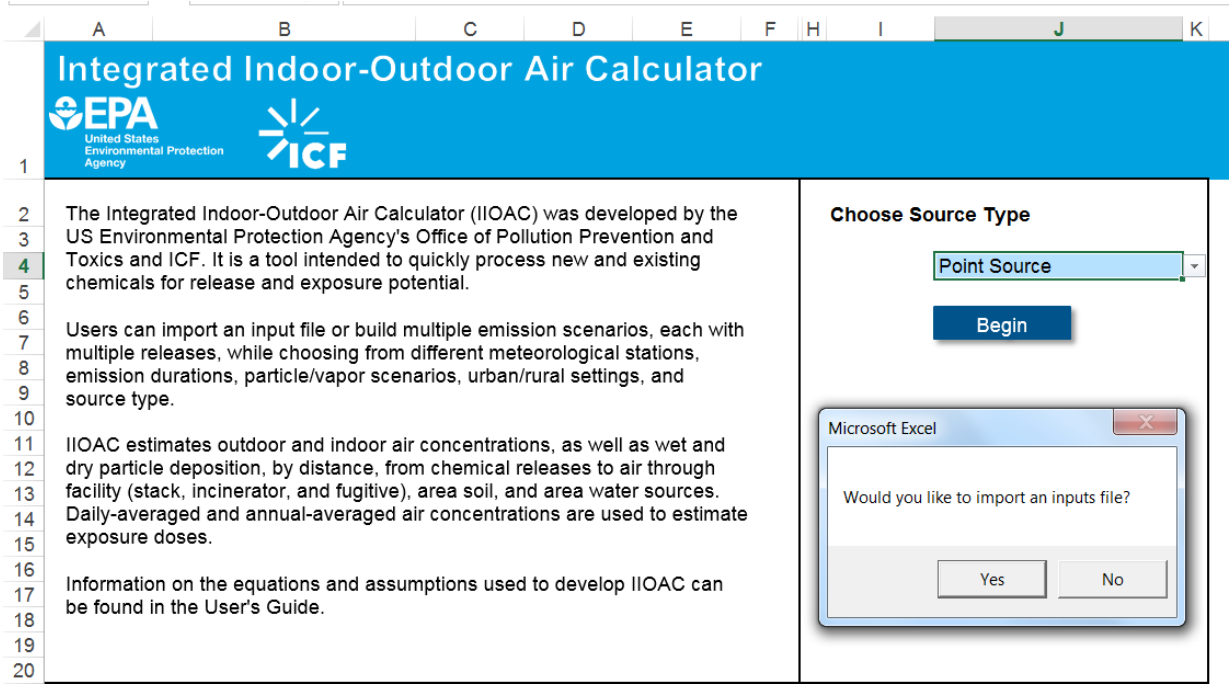

Figure 2. **Introduction Tab** with the import file feature.

If the user chooses to import an input file, the columns in the data file must be in the following order starting in column A:

- Scenario number: must be a whole number,
- Emission scenario: name or description of emission scenario,
- Source type: must be stack, fugitive, incineration, area soil, or area water (e.g., incinerator will not be recognized during the file import process),
- Release number: must be a whole number,
- Mass released per day, in kg/day: must be a number greater than zero, and
- Number of release days per year: must be a whole number between 1 and 365, inclusive.

For the source type of point source, if the user selects the import inputs file option, an additional window appears (Figure 3), asking the user to specify if the point source is a stack, or

one of two possible incinerator options as shown in

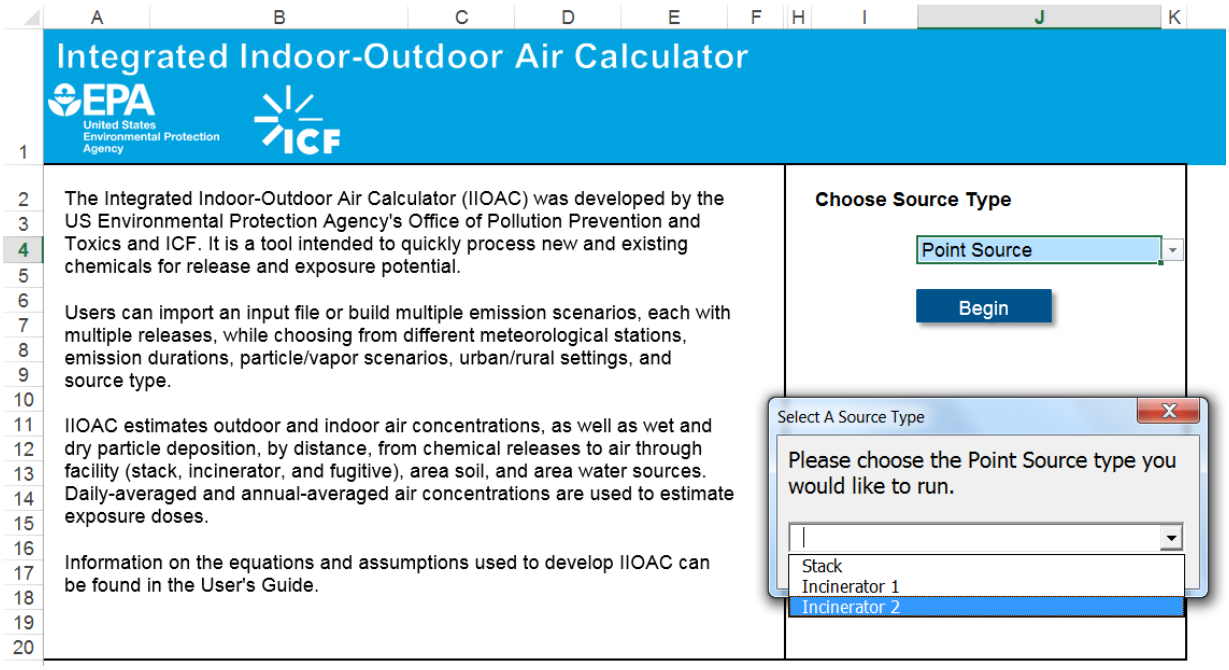

Figure **3.** Options for point source.

Table **5**.

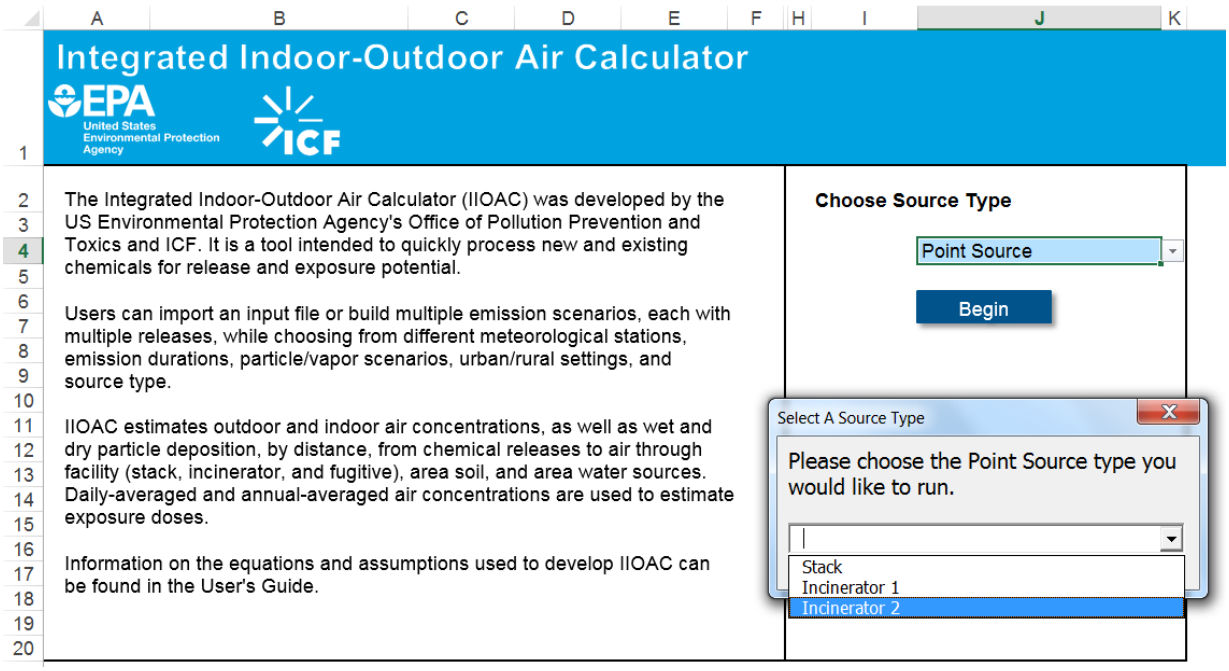

Figure 3. Options for point source.

Table 5. Point source configurations used in the pre-run AERMOD scenarios.

Name for Internal Use	Release Height (m)	Exit Gas Temperature (K)	Inside Diameter (m)	Exit Gas Velocity (m/s)
Stack	10	300	2	5
Average Incinerator	25	500	1	15
High-temperature Incinerator	50	1,200	2	15

Once selected, data from the inputs file is auto-populated into the **Source Inputs Tab** (see Section 3.6) and the user is automatically directed to the **Chemical Tab**. Note that when importing a file, the source type 'incineration' must be used in the inputs file instead of 'incinerator'.

3.5 Chemical Tab

Depending on the source type selected, the user will be required to enter chemical-specific properties. In **Error! Reference source not found.**, the boxes greyed out are not applicable to the source type and do not need to be filled in. For example, the source type selected in **Error! Reference source not found.** is for area water sources and therefore information on solubility and the organic carbon sorption coefficient are not needed.

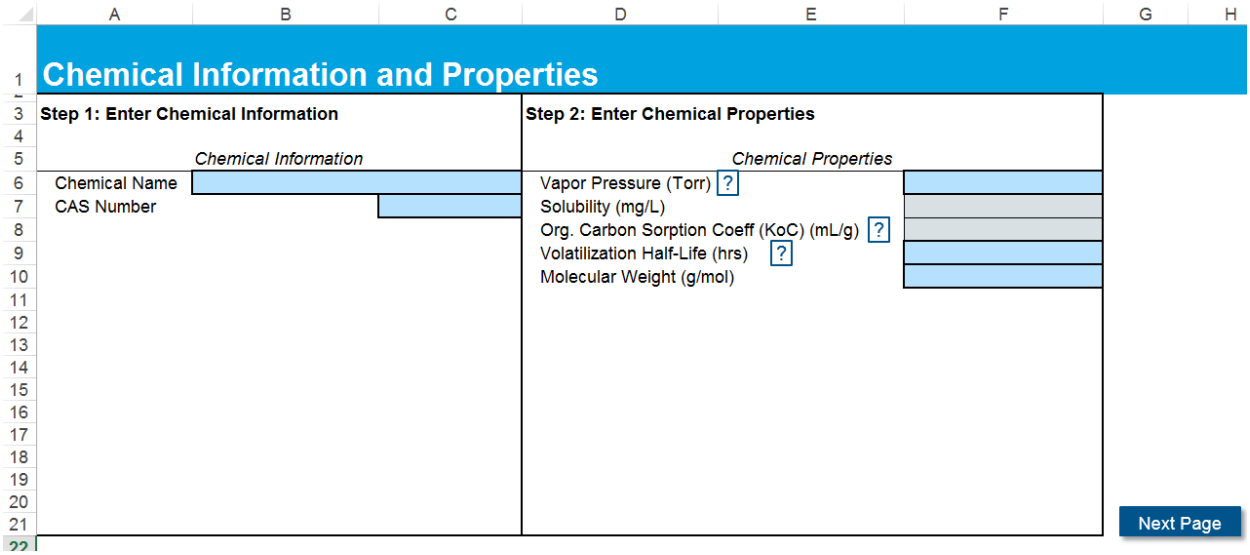

Figure 4. Chemical-specific properties required by IIOAC for area water sources.

Step 1: Enter the chemical information and the CAS number (if available).

Step 2: Enter the chemical properties. Each of the fields in Step 2 are free-text fields.

For the required information in blue boxes, IIOAC has built-in error messages if the user enters a value that is not valid (e.g., negative number for volatilization half-life). Question marks next to a chemical property provides additional information for the user. For example, the question mark next to vapor pressure provides the unit conversion from Torr to Pascal (Pa) or standard atmospheres (atm).

For volatilization half-life, the user can click on the question mark which leads to a pop-up window (Figure 5) that provides a link to EPA's EPI Suite™ (US EPA, 2017a), a parameter estimation program. EPI Suite™ is a screening-level tool and should not be used if acceptable measured values are available. EPI Suite™ provides the following default values to estimate volatilization half-life:

- Water depth = 1 m (for both river and lake),
- Wind velocity = 5 m/s (river); 0.5 m/s (lake), and
- Current velocity = 1 m/s (river); 0.05 m/s (lake).

Volatilization half-life values are used in flux calculations for area water sources and should differ between batch and continuous-flow sources by entering a flowrate value of zero for batch sources.

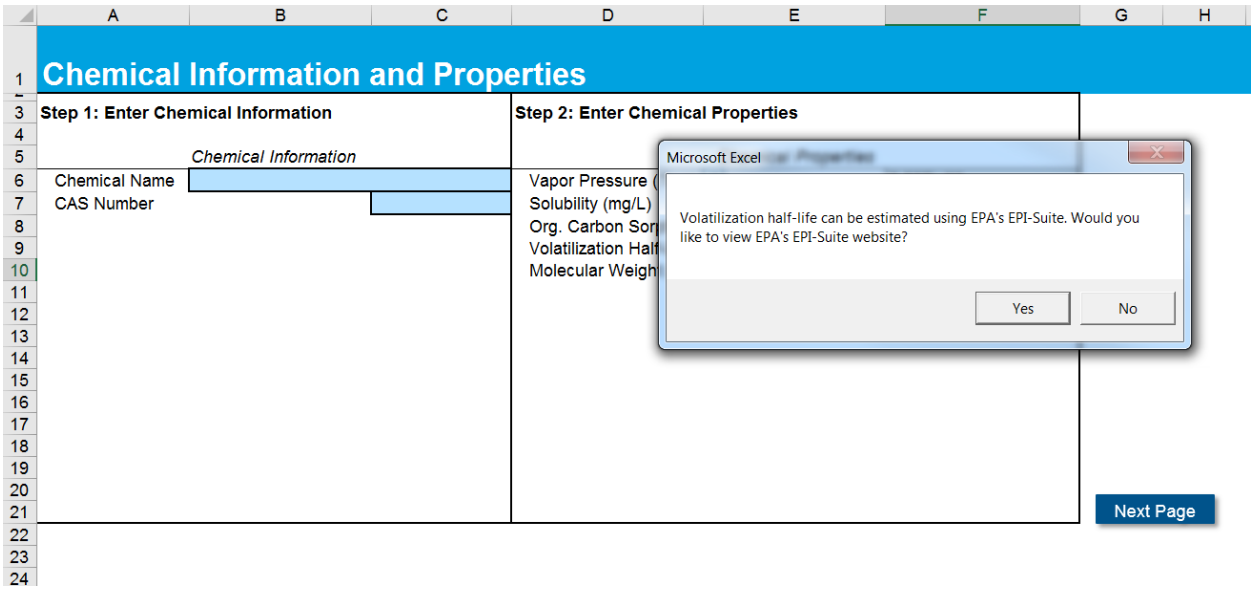

Figure 5. Pop-up window with option to estimate volatilization half-life using EPA's EPI-Suite.

Once you have completed entering information on the **Chemicals Tab**, click the **Next Page** button.

3.6 Source Inputs Tab

IIOAC has a **Source Inputs Tab** for each source type, which varies slightly depending on the source type. In general, the **Source Inputs Tab** consists of three steps: (1) entering source parameters; (2) selecting location and deposition settings; and (3) defining emission scenarios.

Step 1: The user is required to enter source parameters. Depending on the source type, these source parameters include area of source, and for area water sources, the surface area, depth of water, and flowrate. For point sources, if the user did not import an inputs file, the user must select the point source type (stack, incinerator 1, incinerator 2) from the drop-down menu, which will auto-populate the source parameters (see Figure 6).

For area water sources, the user can differentiate between batch and continuous-flow sources by specifying a flowrate value of zero for batch sources and a non-zero flowrate value for continuous-flow sources. The question mark next to the flowrate in IIOAC reminds the user of this differentiation (see Figure 7).

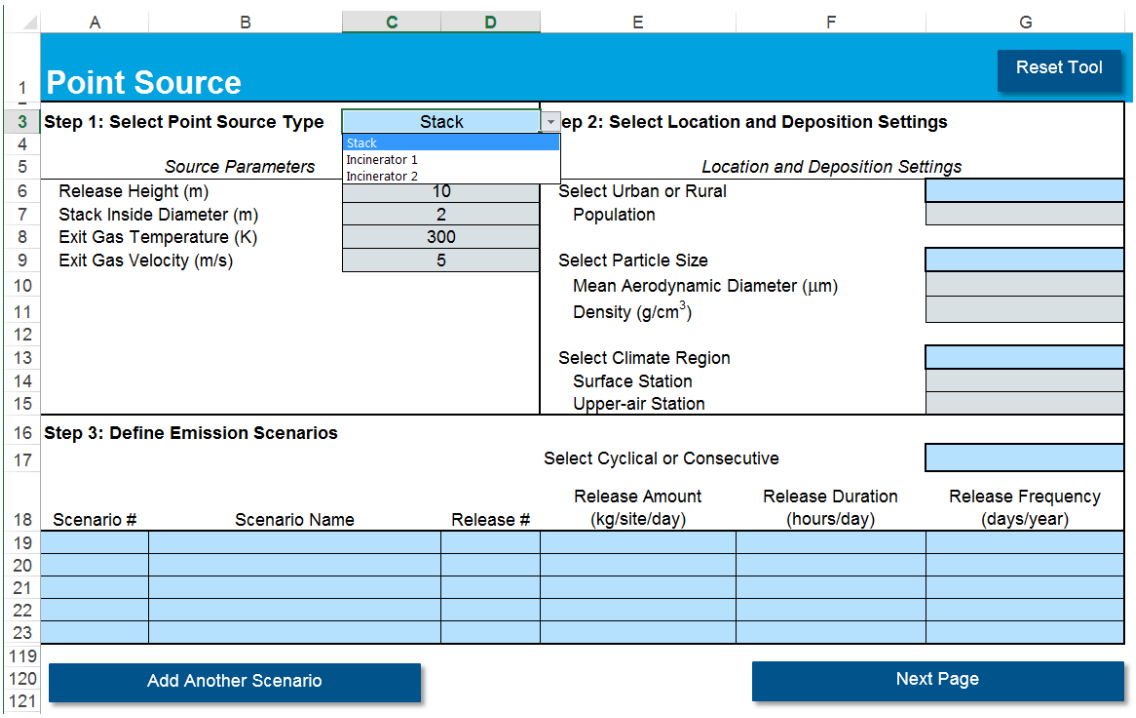

Figure 6. Example **Source Inputs Tab** for point sources when an input file is not imported.

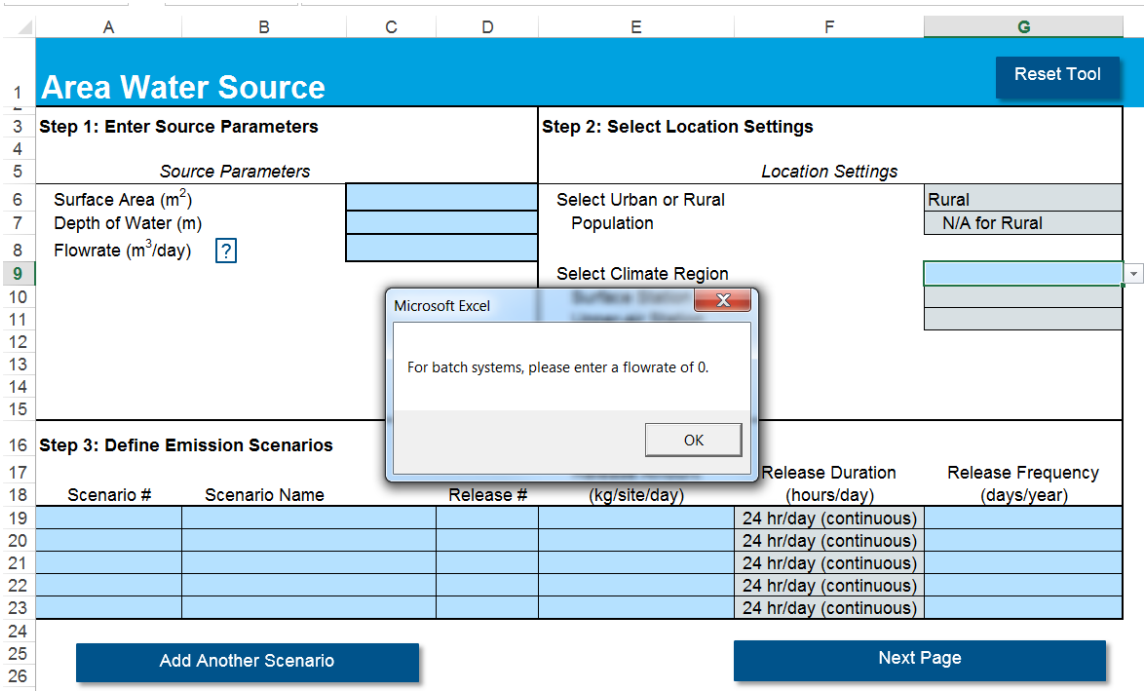

Figure 7. Information button for area water sources specifying that the user can define a batch system by entering a flowrate of zero.

Step 2: The user defines the location and deposition settings through a series of drop-down menus for population scenario (urban or rural), particle size (fine, coarse, or no particles), and climate region (14 possibilities). Blue boxes define what the user must select and the grey boxes are auto-populated based on the user's selection.

Depending on what the user selects in this step, the tool will access the corresponding pre-run AERMOD results of air concentration and particle deposition from the zip file and import these results into the tool.

Step 3: Next, the user will define emission scenarios. If the user imported an input file, the table in step 3 will already be auto-populated with a default release duration of 24 hours/day. The user can also manually change the release duration for point and fugitive sources (see Figure 8).

Note the default release duration is 24 hours for all source types. However, the user has the option of selecting release durations of 1, 4, and 8 hours for point (stack, incinerators) and fugitive sources.

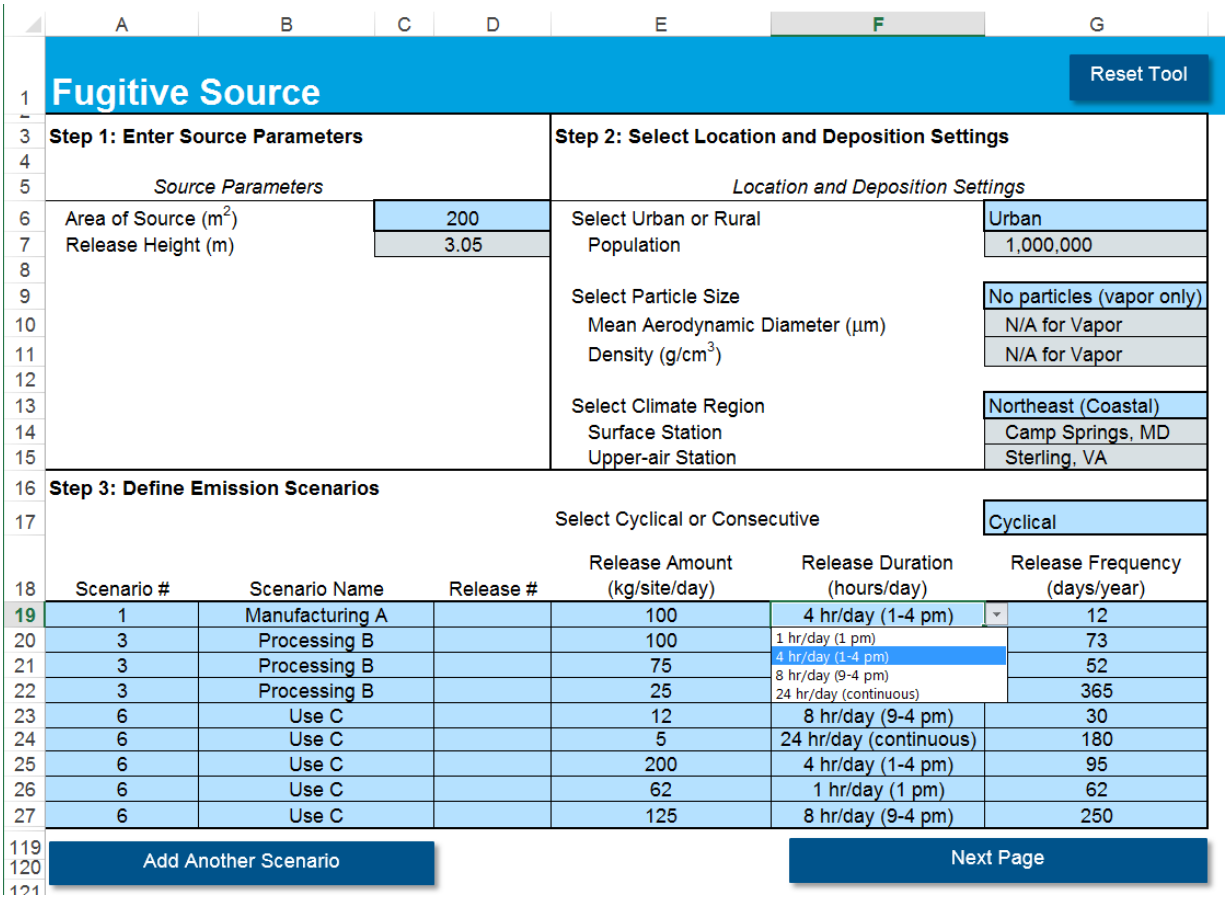

Figure 8. Release duration options for point and fugitive sources.

If an input file was not imported, the user must manually enter the information. Additional scenarios can be added using the **Add Another Scenario** button, up to a total of 100 scenarios

for each source type. For point and fugitive sources, step 3 has an additional feature of asking the user to select whether the releases in a scenario are cyclical (i.e., evenly spaced out over 365 days) or consecutive releases (i.e., consecutive days of release).

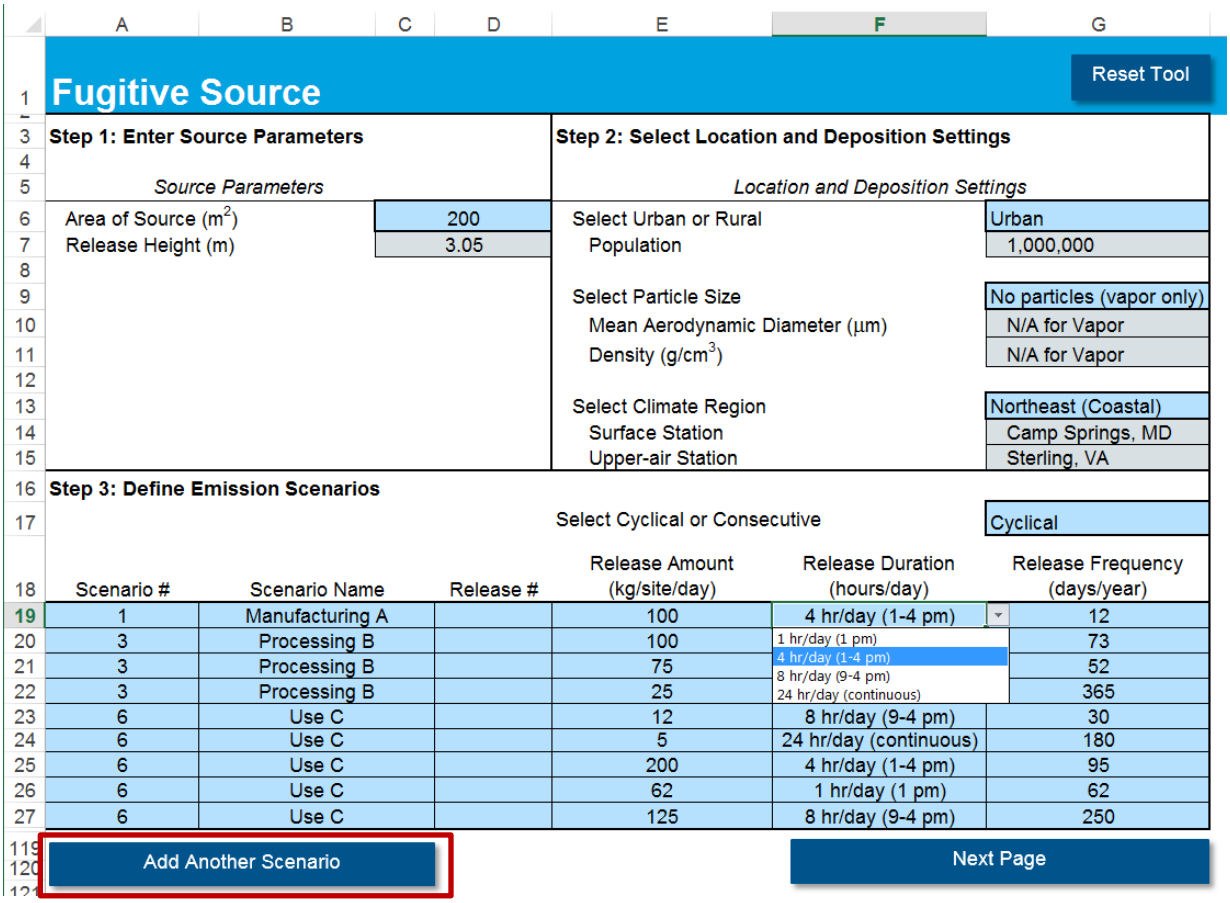

Figure 9. To add another scenario, click the **Add Another Scenario** button.

For users that do not have specific source and/or location and deposition settings in mind, the default settings recommended to provide the conservative estimates for a given scenario (i.e., generally the largest values of air concentration or deposition amounts) are point (specifically stack) sources, urban settings, coarse particles, and climate region corresponding to Idaho Falls.

Once you have completed entering information on the **Source Inputs Tab**, click the **Next Page** button.

3.7 Output Tab

The **Output Tab** provides the outdoor, indoor, total annual particle deposition, and acute and chronic exposure doses (see Figure 10 and Figure 11) for each of the emission scenarios provided by the user. High-end and mean results are provided by receptor group (inner ring or "fenceline" receptors and near-facility "community" receptors). For area soil and area water

sources, the particle deposition columns will be empty as these sources do not emit fine or coarse particles.

Export	Reset									
Source Type	Emission Scenario	Statistic	Location	Outdoor Air Concentration (µg/m^3)		Indoor Air Concentration (µg/m^3)		Total Annual Particle Deposition (g/m^2)		
				Daily	Annual	Daily	Annual	Total	Wet	Dry
Fugitive Source	Manufacturing	High-End	Fenceline Avg	3.50E+01	2.76E+00	3.50E+01	2.76E+00	3.59E-06	3.59E-06	2.93E-09
			Community Avg	5.98E+00	1.97E-01	5.98E+00	1.97E-01	2.37E-07	5.38E-10	2.37E-07
		Mean	Fenceline Avg	3.50E+01	2.27E+00	2.28E+01	1.47E+00	2.95E-06	2.95E-06	1.18E-09
			Community Avg	4.95E+00	1.63E-01	3.22E+00	1.06E-01	1.98E-07	2.17E-10	1.97E-07
	Use	High-End	Fenceline Avg	8.92E+01	4.33E+01	8.92E+01	4.33E+01	5.57E-05	5.57E-05	2.75E-08
			Community Avg	1.13E+01	3.11E+00	1.13E+01	3.11E+00	3.75E-06	5.11E-09	3.75E-06
		Mean	Fenceline Avg	8.72E+01	3.84E+01	5.67E+01	2.49E+01	4.99E-05	4.99E-05	1.99E-08
			Community Avg	9.90E+00	2.76E+00	6.44E+00	1.79E+00	3.35E-06	3.67E-09	3.34E-06
	Processing	High-End	Fenceline Avg	1.18E+02	8.10E+01	1.18E+02	8.10E+01	1.54E-04	1.54E-04	7.43E-08
			Community Avg	2.33E+01	8.79E+00	2.33E+01	8.79E+00	1.05E-05	1.38E-08	1.05E-05
		Mean	Fenceline Avg	1.17E+02	7.96E+01	7.59E+01	5.18E+01	1.36E-04	1.36E-04	5.41E-08
			Community Avg	2.00E+01	7.52E+00	1.30E+01	4.89E+00	9.12E-06	9.98E-09	9.11E-06
			Max	1.18E+02	8.10E+01	1.18E+02	8.10E+01	1.54E-04	1.54E-04	1.05E-05

Figure 10. IIOAC output metrics of outdoor air concentration, indoor air concentration, and total particle deposition.

Export	Reset			Acute Dose (mg/kg/day)		Chronic Dose (mg/kg/day)		
Source Type	Emission Scenario	Statistic	Location	Young Toddler	Adult	Young Toddler	Adult	Lifetime
				1 - <2 years	16 - <78 years	1 - <2 years	16 - <78 years	
Fugitive Source	Manufacturing	High-End	Fenceline Avg	5.31E-02	7.83E-03	1.93E-03	5.31E-04	2.43E-04
			Community Avg	9.07E-03	1.34E-03	1.38E-04	3.79E-05	1.74E-05
		Mean	Fenceline Avg	3.50E-02	5.61E-03	1.05E-03	3.13E-04	1.42E-04
			Community Avg	4.95E-03	7.93E-04	7.53E-05	2.25E-05	1.02E-05
	Use	High-End	Fenceline Avg	1.35E-01	1.99E-02	3.04E-02	8.35E-03	3.82E-03
			Community Avg	1.71E-02	2.53E-03	2.19E-03	6.00E-04	2.75E-04
		Mean	Fenceline Avg	8.71E-02	1.40E-02	1.78E-02	5.30E-03	2.40E-03
			Community Avg	9.89E-03	1.59E-03	1.28E-03	3.80E-04	1.72E-04
	Processing	High-End	Fenceline Avg	1.80E-01	2.65E-02	5.69E-02	1.56E-02	7.15E-03
			Community Avg	3.52E-02	5.20E-03	6.16E-03	1.69E-03	7.75E-04
		Mean	Fenceline Avg	1.17E-01	1.87E-02	3.68E-02	1.10E-02	4.98E-03
			Community Avg	2.00E-02	3.21E-03	3.48E-03	1.04E-03	4.70E-04
			Max	1.80E-01	2.65E-02	5.69E-02	1.56E-02	7.15E-03

Figure 11. IIOAC output metrics of acute and chronic dose by age groups.

3.8 Export and Reset Features

IIOAC offers the user the ability to export the Inputs file, **Source Inputs Tab** and **Output Tab** into a separate Excel workbook. Throughout the use of the tool, the user can also click on **Reset** to clear all data entered into the tool and restart the tool.

To export the results click the **Export** button at the top of the tab.

	A	B	C	D	M	R	T	Y	Z
1	Export	Reset			Acute Dose (mg/kg/day)		Chronic Dose (mg/kg/day)		
2	Source Type	Emission Scenario	Statistic	Location	Young Toddler	Adult	Young Toddler	Adult	Lifetime
3					1 - <2 years	16 - <78 years	1 - <2 years	16 - <78 years	
4	Fugitive Source	Manufacturing	High-End	Fenceline Avg	5.31E-02	7.83E-03	1.93E-03	5.31E-04	2.43E-04
6				Community Avg	9.07E-03	1.34E-03	1.38E-04	3.79E-05	1.74E-05
7			Mean	Fenceline Avg	3.50E-02	5.61E-03	1.05E-03	3.13E-04	1.42E-04
9				Community Avg	4.95E-03	7.93E-04	7.53E-05	2.25E-05	1.02E-05
10		Use	High-End	Fenceline Avg	1.35E-01	1.99E-02	3.04E-02	8.35E-03	3.82E-03
12				Community Avg	1.71E-02	2.53E-03	2.19E-03	6.00E-04	2.75E-04
13			Mean	Fenceline Avg	8.71E-02	1.40E-02	1.78E-02	5.30E-03	2.40E-03
15				Community Avg	9.89E-03	1.59E-03	1.28E-03	3.80E-04	1.72E-04
16		Processing	High-End	Fenceline Avg	1.80E-01	2.65E-02	5.69E-02	1.56E-02	7.15E-03
18				Community Avg	3.52E-02	5.20E-03	6.16E-03	1.69E-03	7.75E-04
19			Mean	Fenceline Avg	1.17E-01	1.87E-02	3.68E-02	1.10E-02	4.98E-03
21				Community Avg	2.00E-02	3.21E-03	3.48E-03	1.04E-03	4.70E-04
22				**Max**	1.80E-01	2.65E-02	5.69E-02	1.56E-02	7.15E-03

Figure 12. Exporting the results of the IIOAC tool.

4 References

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