



**Safe
Environment
Engineering**

Life•line MultiMeterViewer Integrated CT-Analyst
Accurate, Instantaneous 3D Plume Modeling Tool

Developed by the Naval Research Laboratory

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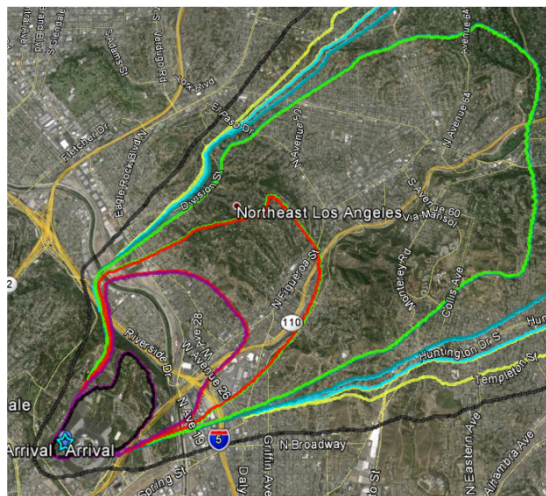
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Introduction:

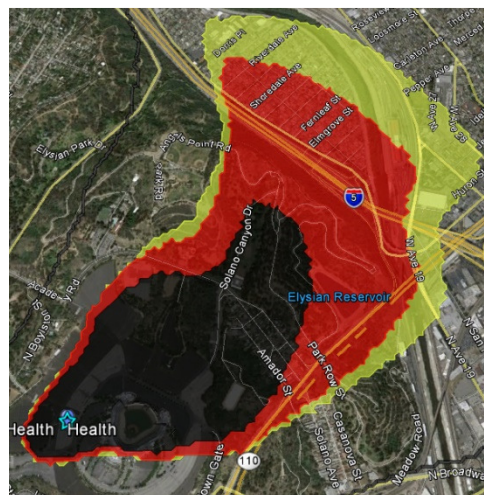
The MultiMeterViewer CT-Analyst plume tool integrates 3D accurate plume modeling developed by the United States Naval Research Laboratory with the Safe Environment Engineering sensor based common operational picture. The combined tools provide operators a comprehensive system to analyze real-time environmental conditions and quickly build predictive release models optimized for urban environments.

CT-Analyst incorporates modeling tools based on a known release location which include:

Arrival time based on selected wind speed and direction of a neutrally buoyant release

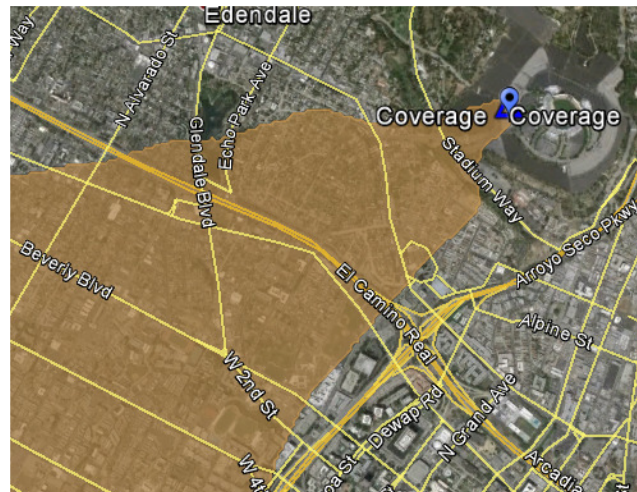


Health affects which indicates the protective action criteria borders based on the contaminant, its release rate and release duration.

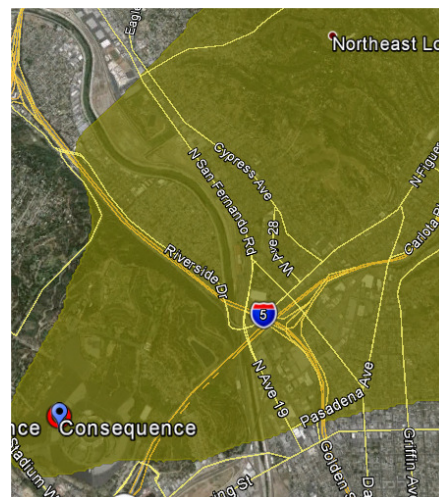


Models can also be built from a sensor perspective:

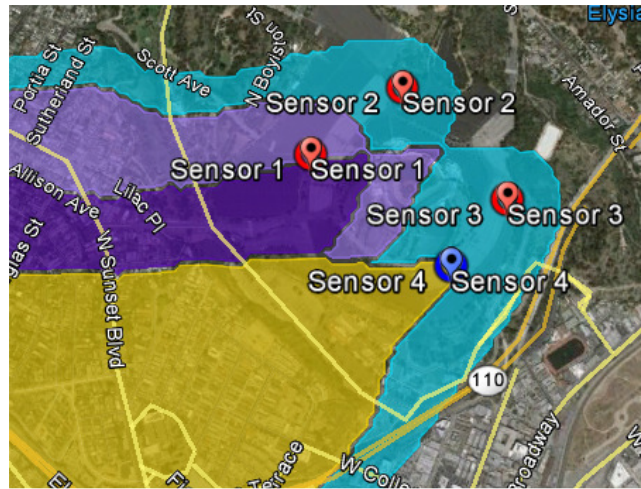
A coverage model predicts where a release might have come from given a sensor detection and wind condition.



A consequence model predicts the release area potential given a sensor detection and condition.

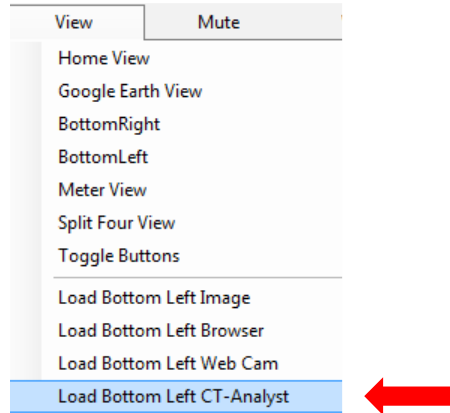


A backtrack tool uses multiple sensors detection capability and wind conditions to more accurately predict a release location



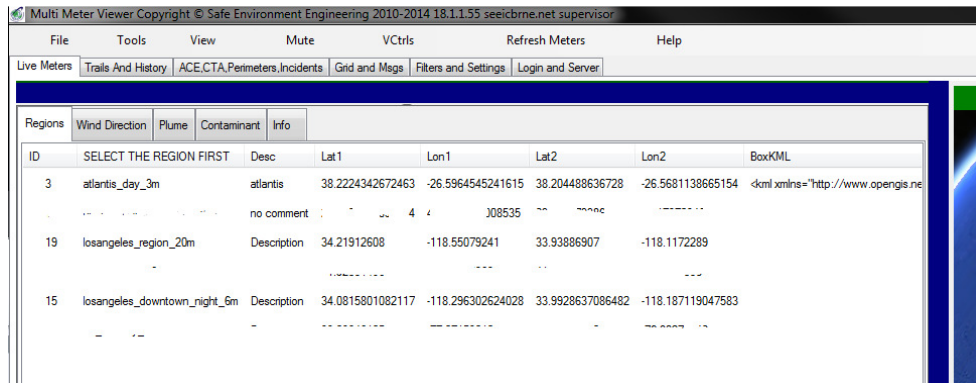
Building a Model:

To build a model select Load Bottom Left CTR-Analyst from the View tab.

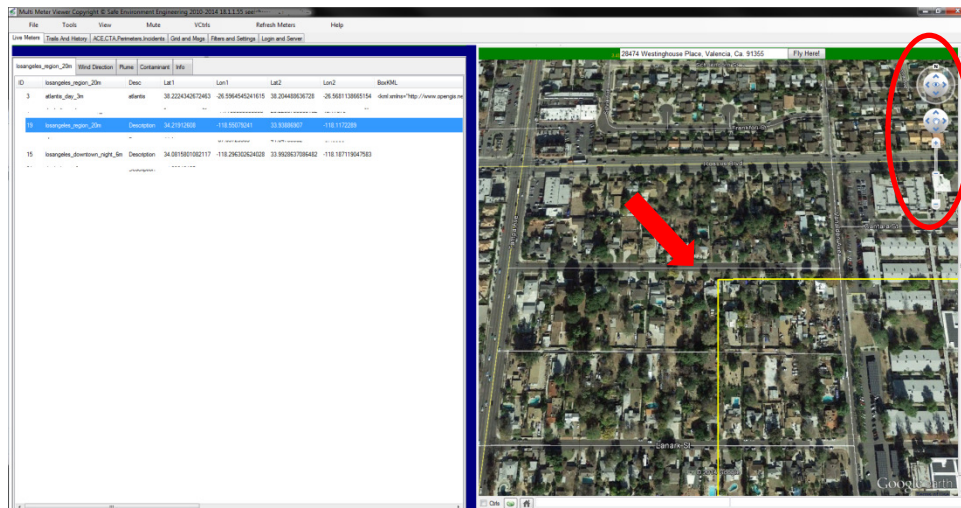


Regions:

The display will resize revealing a list of regions available to render a model based on the credentials used when the MultiMeterViewer was started.



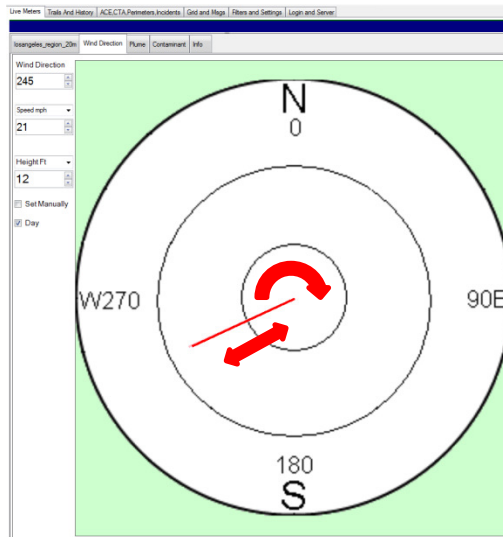
Double clicking the desired region will shift the map to the upper left corner of the region's boundary allowing you to resize the map to match your modeling requirements.



Size as needed

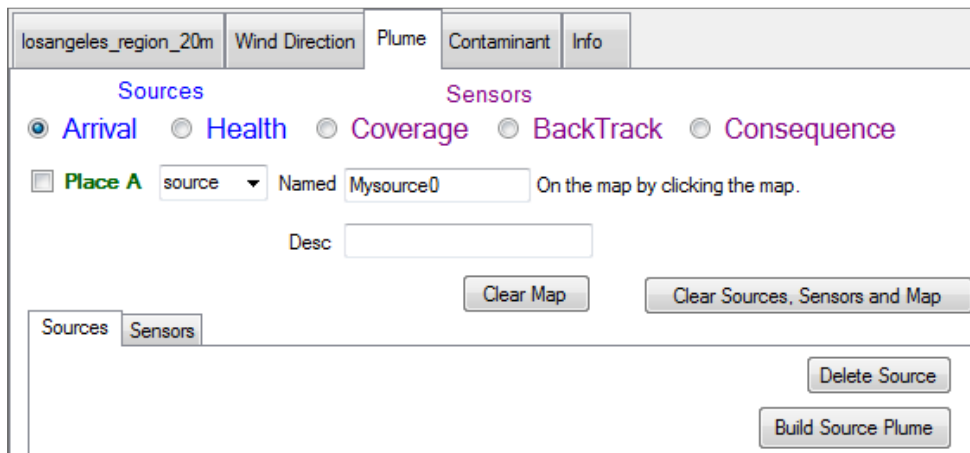
Wind:

Selecting the Wind Direction tab will allow you to set the wind speed and direction using the wind dial or manually by setting specific wind direction degrees, wind speed and the height of the release above the ground. Selecting the Day option will include or exclude additional thermal modeling characteristics.



Building Plumes:

Selecting the Plume tab will reveal additional modeling options.

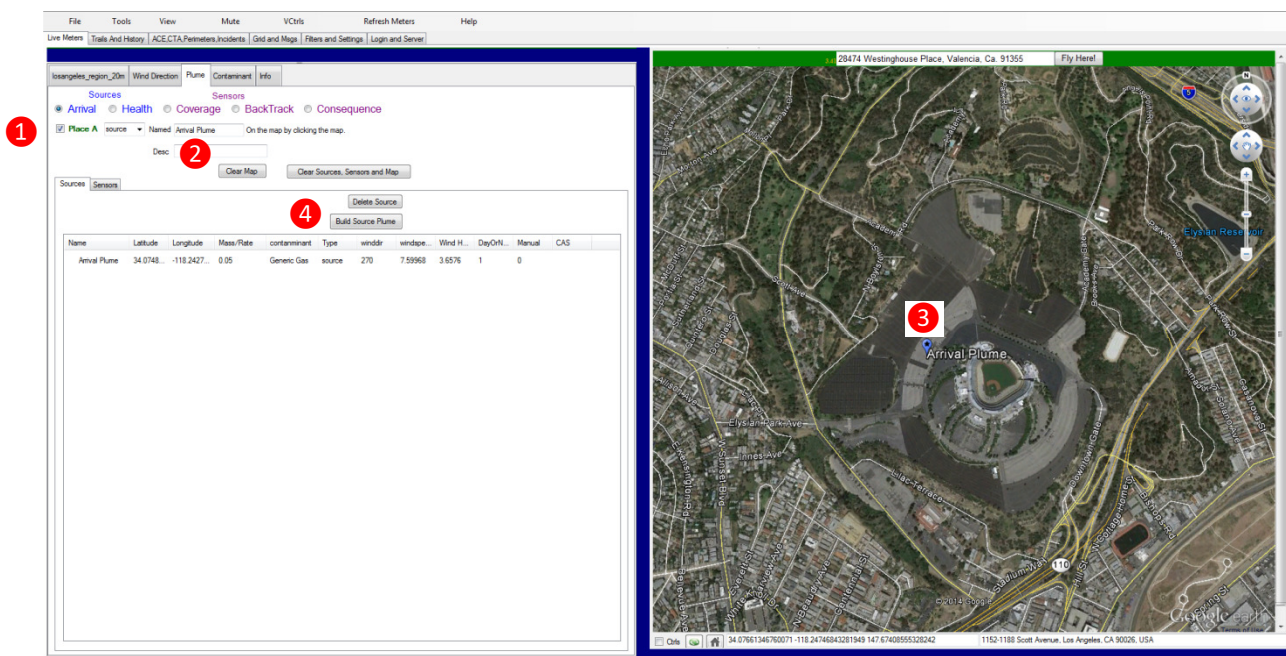


First select which type of model you wish to create. Different modeling options will be revealed based on the model chosen.

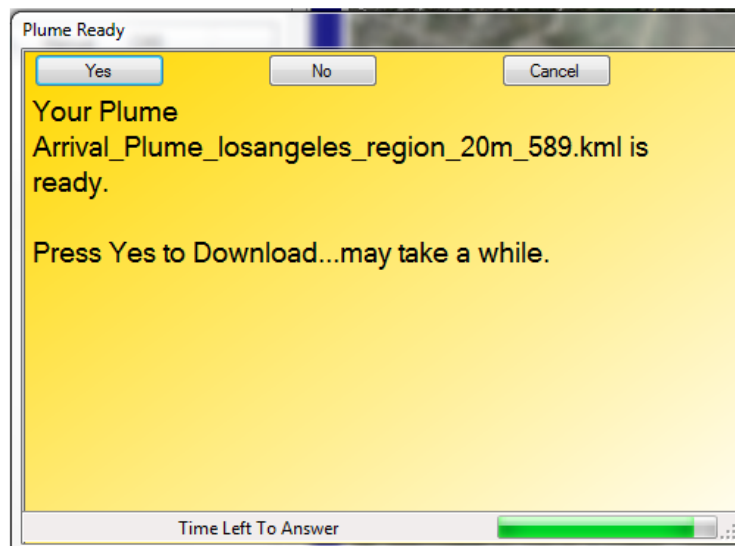
Arrival Time:

Arrival time models the time it would take a neutrally buoyant non-defined contaminant to arrive at distant locations. This is simply a time based model and does not need any information about the contaminant or the release thus all that is necessary is to select a release source location.

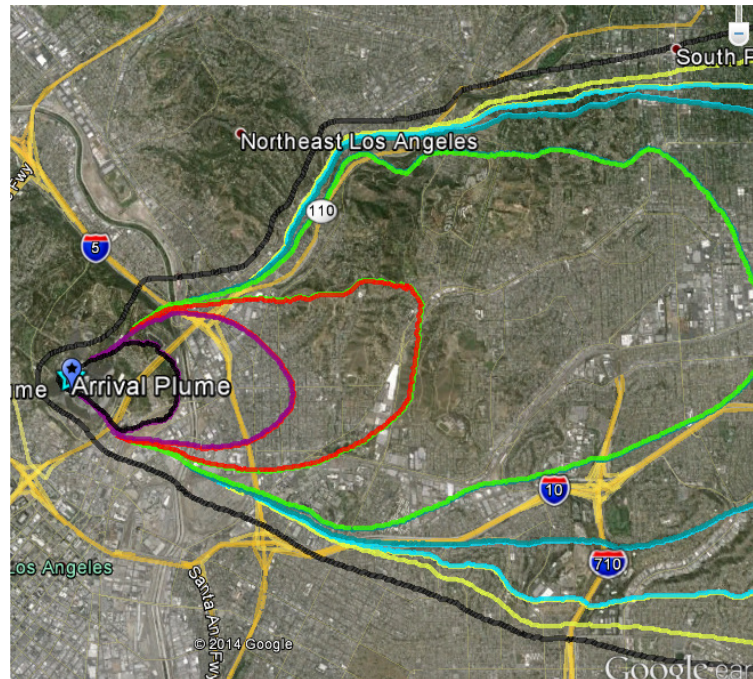
A source location is selected by placing a check mark in the Place A box **1** naming the source or allowing the MultiMeterViewer to automatically name the source **2** and clicking on the map to create a source point **3**.



To model a plume click the Build Source Plume button **4**. A screen prompt will be displayed indicating that the plume is being built on the ICBRNE Sensor Servers and asking if you would like to download to your map. Selecting yes will download and display the plume.



The color plume outlines indicate different arrival times. Black 5 minutes, purple 10 minutes, red 15 minutes, green 30 minutes, dark blue 45 minutes, light blue 1 hour and yellow 2 hours.



Health Effects:

The Health Effects plume is used to model the Protective Action Criterion (PAC) levels for chemicals. There are three PAC levels, **Yellow** indicating a mild transient health effect, **Red** being irreversible or other serious health effects that could impair the ability to take protective actions and **Black** being life-threatening health effect.

Health Effects plumes have several additional modeling parameters

losangeles_region_20m	Wind Direction	Plume	Contaminant	Info
Sources		Sensors		
<input type="radio"/> Arrival	<input checked="" type="radio"/> Health	<input type="radio"/> Coverage	<input type="radio"/> BackTrack	<input type="radio"/> Consequence
<input type="checkbox"/> Place A	source	Named	MySource4	On the map by clicking the map.
<input type="checkbox"/> PAC-1	Desc			
<input type="checkbox"/> PAC-2				
<input type="checkbox"/> PAC-3				
		Clear Map		Clear Sources, Sensors and Map
Sources		Sensors		
Release Type	Rate g/sec	Duration	00:00:00	
continuous	0.05		Delete Source	
				Build Source Plume

Release Type indicates if the contaminant is being continuously released or if was all released instantaneously.

Release Type

continuous


continuous

instantaneous

The Rate of release parameter is provided in grams per second. For reference there are approximately a million grams in a ton.

Rate g/sec

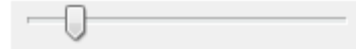
1000000



The Duration slider sets the amount of time the contaminant was released from its source.

Duration

00:10:12



The Contaminant tab provides a lookup to specify the contaminant being modeled.

losangeles_region_20m

Wind Direction

Plume

Contaminant

Info

Typing the contaminant name and pressing the Find button will provide fast access to the desired contaminant. Click on the contaminant to select it.

losangeles_region_20m

Wind Direction

Plume

Chlorine

Info

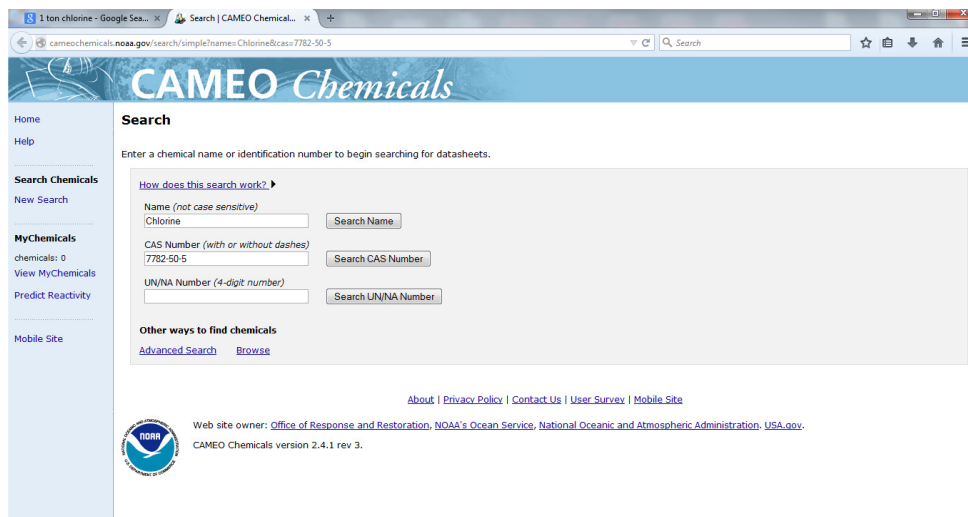
show AutoClose

Selected Name: Chlorine CAS: 7782-50-5 Unit: ppm

Find Info

Name	CAS Number	UN Num	PAC Units	PAC-1
Chlorfenvinfos	470-90-6		mg/m3	6
Chloride; (Chloride(1-); Chloride ions)	16887-00-6		ppm	1
Chlorinated polyolefins	68410-99-1		mg/m3	30
Chlorine	7782-50-5		ppm	0.50
Chlorine dioxide	10049-04-4		ppm	0.15

Pressing the Info button will launch the CAMEO Chemicals website and provide additional information on the contaminant when available.



1 ton chlorine - Google Sea... Search | CAMEO Chemicals... x

cameochemicals.noaa.gov/search/simple?name=Chlorine&cas=7782-50-5

CAMEO Chemicals

Home

Help

Search Chemicals

New Search

MyChemicals

chemicals: 0

View MyChemicals

Predict Reactivity

Mobile Site

Search

Enter a chemical name or identification number to begin searching for datasheets.

[How does this search work?](#)

Name (not case sensitive)
Chlorine

CAS Number (with or without dashes)
7782-50-5

UN/NA Number (4-digit number)


Other ways to find chemicals

[Advanced Search](#) [Browse](#)

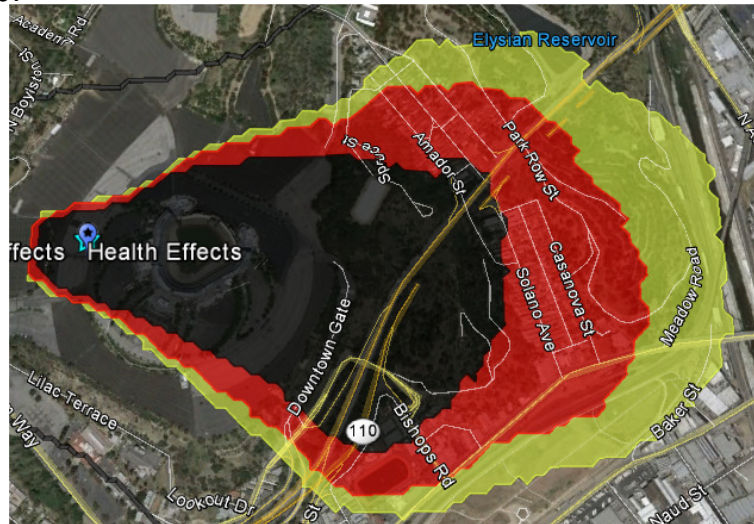
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Web site owner: [Office of Response and Restoration](#), [NOAA's Ocean Service](#), [National Oceanic and Atmospheric Administration](#), [USA.gov](#).

CAMEO Chemicals version 2.4.1 rev 3.

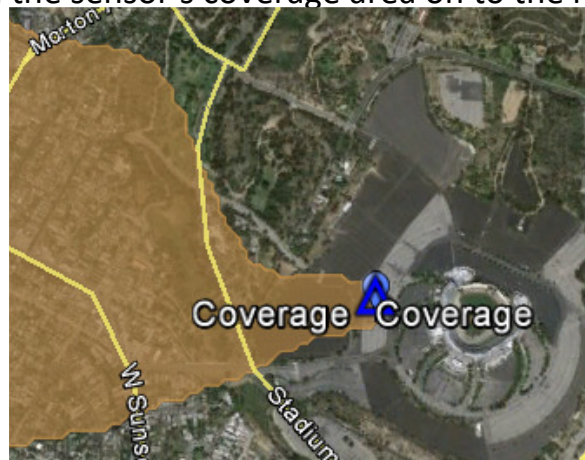


Returning to the Plume and Placing A ① ② ③ source on the map followed by pressing the Build Source Plume button ④ will download the Health Effects plume on to the map.



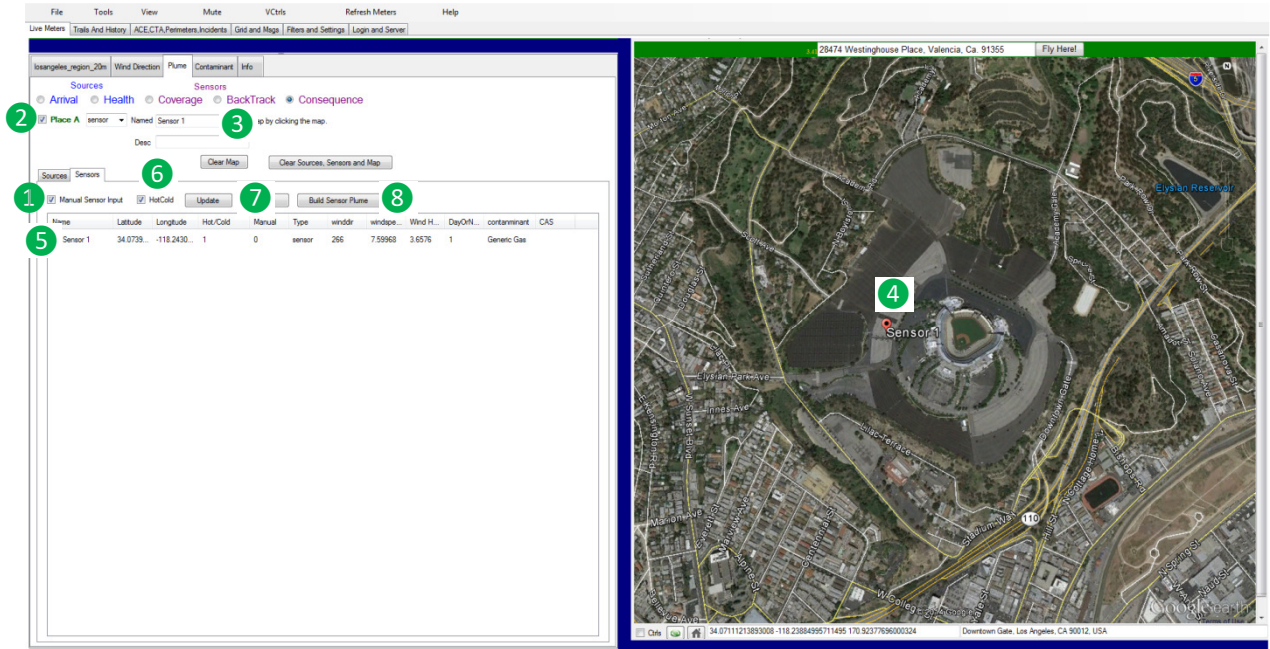
Sensor Modeling:

Selecting Coverage Coverage will provide a model that predicts where a release might have come from given a sensor detection and wind condition. Placing A ① ② ③ sensor on the map followed by pressing the Build Source Plume button ④ will download the sensor's coverage area on to the map.



Selecting Consequence Consequence will provide a model that predicts the release area potential given a sensor detection and wind condition. To place a sensor into a detection or Hot state move the map to the desired location then place the sensor in manual mode by select the Manual Sensor Input box ①. Place

a check mark into the Place A box ②, name it appropriately ③ and click the desired location on the map ④ to place the sensor. To change the sensors state click on the sensor in table ⑤ followed by making the sensor Hot by placing a checkmark in the HotCold box ⑥. Pushing the Update button ⑦ will turn the sensor red on the map.



Pressing the Build Source button ⑧ will download the predicted contamination coverage area on to the map.



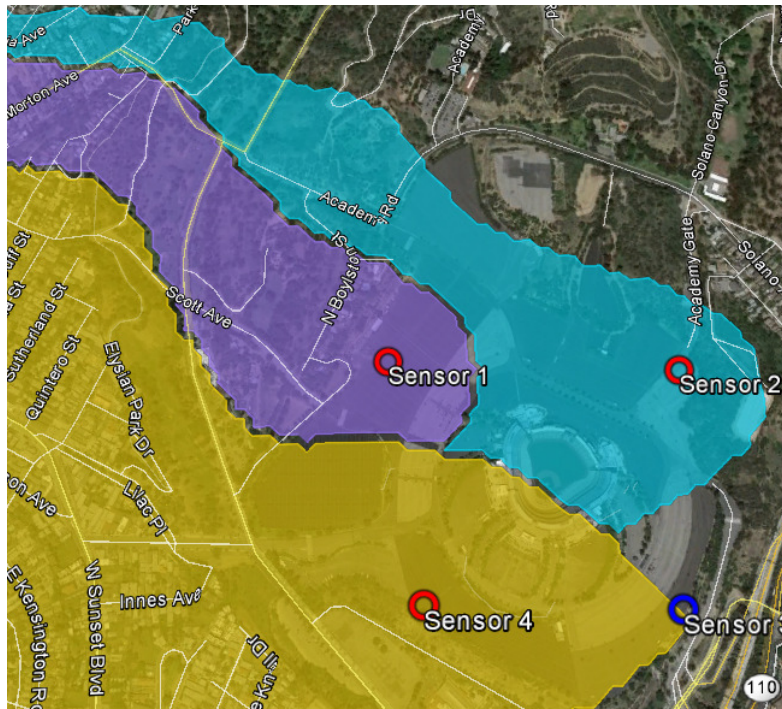
BackTrack:

Selecting BackTrack will provide a model that utilizes multiple sensors and their detection state to more accurately predict a release source location. To place a sensor into a detection or Hot state move the map to the desired location then place the sensor in manual mode by select the Manual Sensor Input box **1**. Place a check mark into the Place A box **2**, name it appropriately **3** and click the desired location on the map **4** to place the sensor. Repeat the process of using the Place A **2** check box in conjunction with the Named **3** input box to select and place more sensors at desired locations on the map **4**. Highlight the specific sensors from with the table **5** that are detecting the contaminant and change their state to Hot by making sure the HotCold box **6** is checked and pressing the update button **7**. The map thumb pin will change color to red indicating a sensor

The screenshot displays the BackTrack software interface. On the left, a table lists sensor data, and on the right, a map shows sensor locations marked with red pins. The interface includes various controls for sensor management and data visualization.

Name	Latitude	Longitude	Hot/Cold	Manual	Type	windr	windspe...	Wind H...	Day/Of...	contaminant	CAS
Sensor 1	34.0758...	-118.2438...	0	1	sensor	265	7.15264	3.6576	1	Generic Gas	
Sensor 2	34.0756...	-118.2363...	1	1	sensor	265	7.15264	3.6576	1	Generic Gas	
Sensor 3	34.0711...	-118.2372...	0	1	sensor	265	7.15264	3.6576	1	Generic Gas	
Sensor 4	34.0711...	-118.2431...	1	1	sensor	265	7.15264	3.6576	1	Generic Gas	

Pressing the Build Source button **8** will download the predicted source location area on the map. The purple area indicates the most likely source locations.



Editing:

Additional model editing buttons include a Clear Map button for removing map plumes and a Clear Sources, Sensors and Map button for clearing the map, sources and sensors from the current session.