

CAMEO Refresher Exercise Set: September, 2010
CAMEO and Reactive Chemicals: Transportation Incident
(continuation of August, 2010 Refresher Exercise)

Scenario:

A semi tractor-trailer placarded 1033 has overturned on a local roadway. The pressurized tank is lying on its side and has structural damage. Product is leaking from the tank; best estimate is there is a 1" x 1.5" hole in the tank located about halfway up the tank on the front side. In addition, the relief valve appears to have sustained damage, and it is unclear whether the relief valve is functioning properly. Initial information suggests this is an 8,000 gallon capacity tanker. The wind is from the West at 10 mph.

Choose a location in your community where this incident could occur.

Refer to the August, 2010 CAMEO Refresher before starting this exercise group. The August exercise covered topics of:

CAMEO Chemicals

Reactivity Worksheet

MARPLOT placement of incident scene

Creating Multiple ALOHA Threat Zones

Source: Direct / Instantaneous versus Tank

Dispersion Model: Gaussian versus Heavy Gas

Tank Parameters: Changing Hole Size and Location

Threat Zone Outputs: Toxic versus Flammable Area versus Explosion

For this incident, users will need to evaluate a number of ALOHA Threat Zones by varying the Source, Dispersion Model, and Tank Parameters. In addition, users will need to evaluate the potential dangers from a Toxic cloud, a Flammable Area, and a Vapor Cloud Explosion.

The August, 2010 CAMEO Refresher provides information on the above CAMEO operations.

Users may wish to display the various ALOHA Threat Zone predictions on both MARPLOT and Google Earth maps. The steps for saving ALOHA Threat Zones are found on page 124 of the CAMEO Companion.

DISPLAYING MULTIPLE ALOHA THREAT ZONES

METHOD 1: Displaying multiple Threat Zones on MARPLOT

There are 2 ways to display multiple Threat Zones on MARPLOT. Both involve moving the ALOHA map objects to a different MARPLOT Overlay.

1. Export the ALOHA map objects as a shapefile; then import back to MARPLOT
2. Use the "Overlays / Create New Polygon" menu to merge the Threat Zones into a single map object.

EXPORT SHAPEFILE METHOD

1. Create your initial ALOHA Threat Zone based on the following information taken from the August, 2010 Refresher Exercise

ALOHA

Use ALOHA to model this incident.

SITE DATA:

Location: TULSA, OKLAHOMA
Building Air Exchanges Per Hour: 0.79 (sheltered single storied)
Time: October 1, 2010 1011 hours CDT (using computer's clock)

CHEMICAL DATA:

Chemical Name: DIMETHYL ETHER **Molecular Weight:** 46.07 g/mol
TEEL-1: 3000 ppm **TEEL-2:** 10000 ppm **TEEL-3:** 60000 ppm
LEL: 33000 ppm **UEL:** 273000 ppm
Ambient Boiling Point: -13.7° F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 10 knots from W at 3 meters
Ground Roughness: urban or forest **Cloud Cover:** 5 tenths
Air Temperature: 77° F **Stability Class:** D
No Inversion Height **Relative Humidity:** 50%

SOURCE STRENGTH:

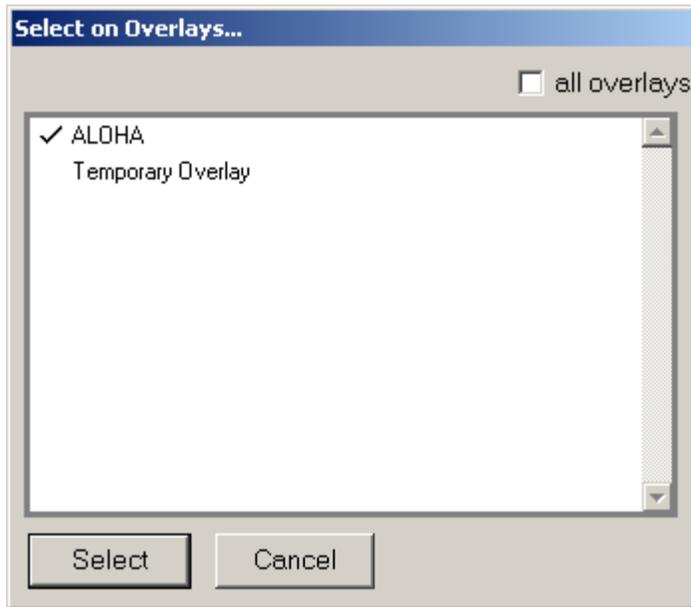
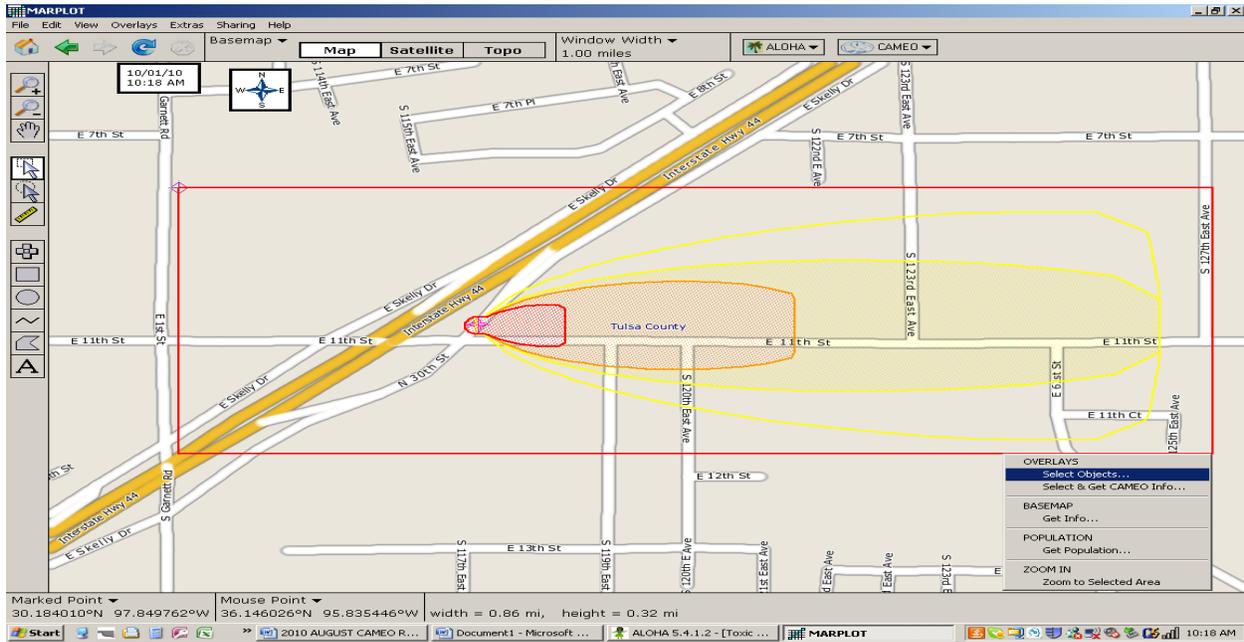
Direct Source: 8000 gallons **Source Height:** 0
Source State: Liquid
Source Temperature: equal to ambient
Release Duration: 1 minute
Release Rate: 730 pounds/sec
Total Amount Released: 43,793 pounds
Note: This chemical may flash boil and/or result in two phase flow.

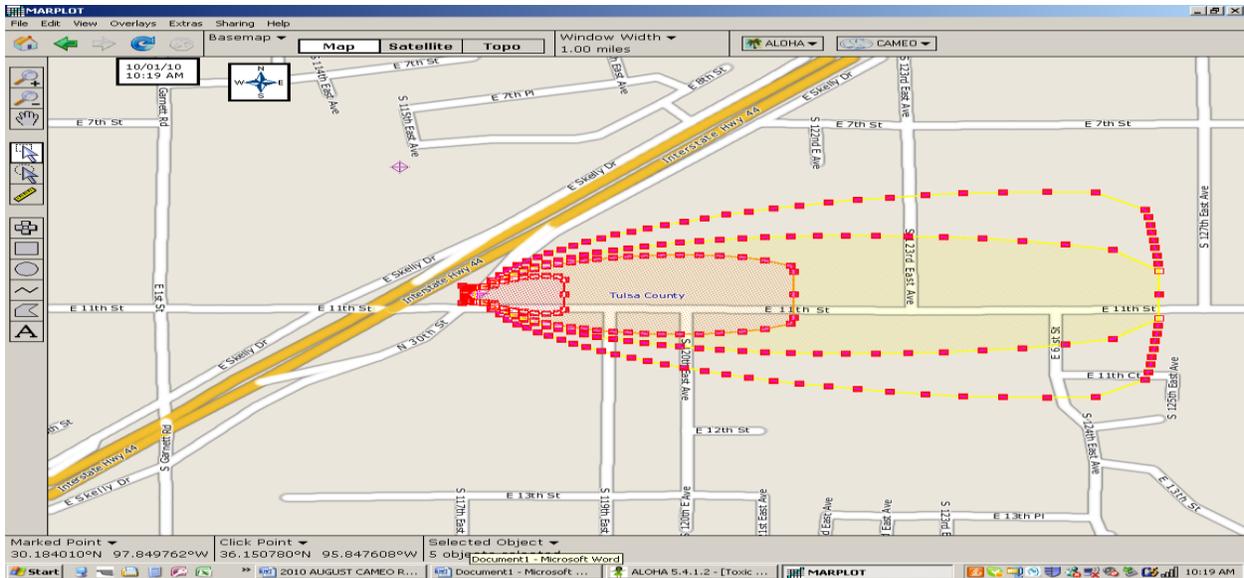
THREAT ZONE:

Model Run: Heavy Gas
Red : 134 yards --- (60000 ppm = TEEL-3)
Orange: 488 yards --- (10000 ppm = TEEL-2)
Yellow: 1022 yards --- (3000 ppm = TEEL-1)

Your initial Threat Zone for Toxic should look something like this:

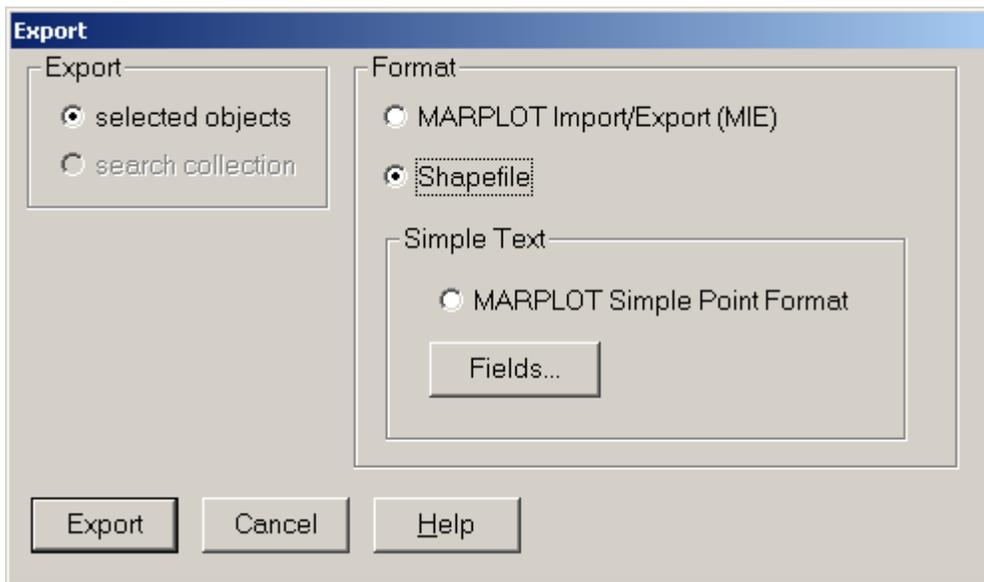
3. Use the Quick Search Pointer Tool to select all the ALOHA map objects (CAMEO Companion 67-68)





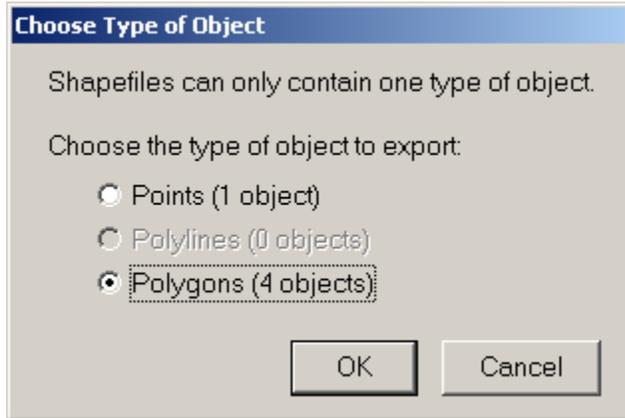
Your MARPLOT screen should look like the above.

4. Use the File / Export Overlay Objects menu (CAMEO Companion page 125)

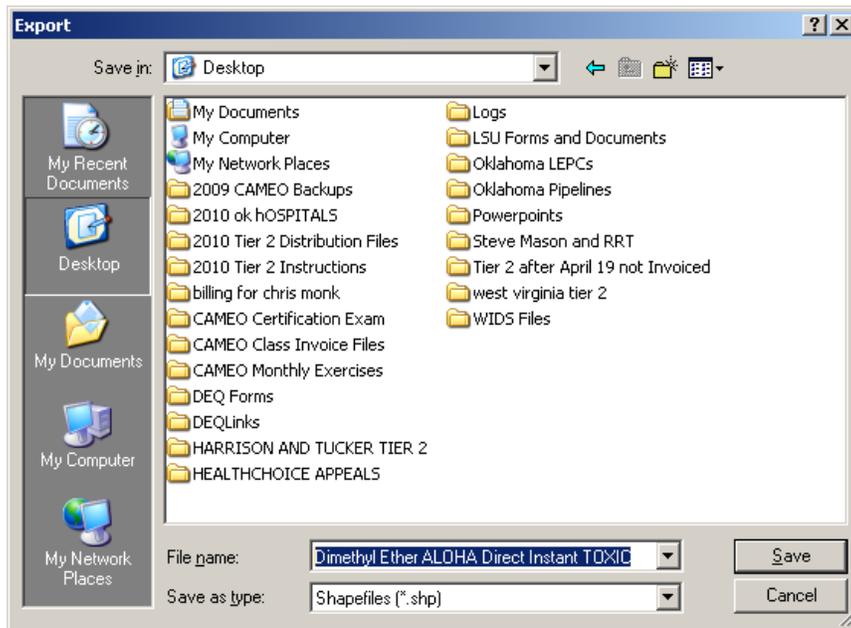


Make sure to select the format as “Shapefile”

5. Select “Polygons” from the “Choose Type of Object” dialog box

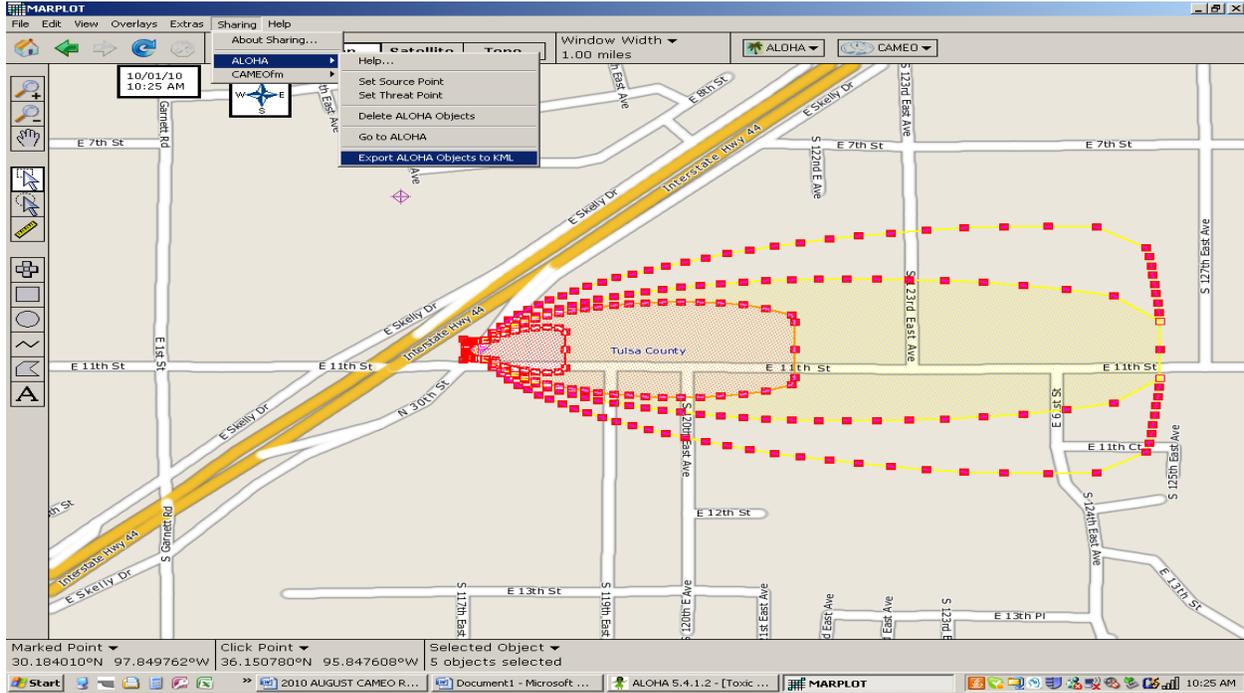


6. Save the file as “Dimethyl Ether ALOHA Direct Instant TOXIC.shp”



The ALOHA map objects have now been exported to the .shp file. This file may be imported to MARPLOT, ArcView, or any other mapping application that accepts shapefile imports.

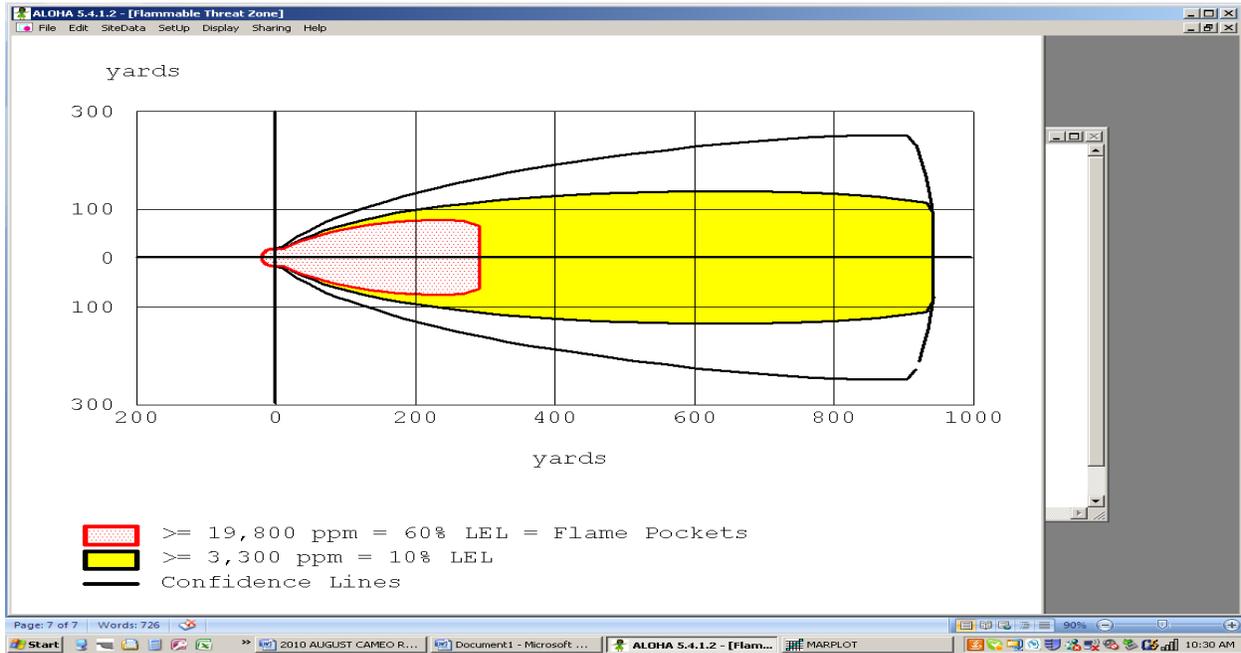
7. Select the “Sharing / ALOHA / Export objects to KML” menu



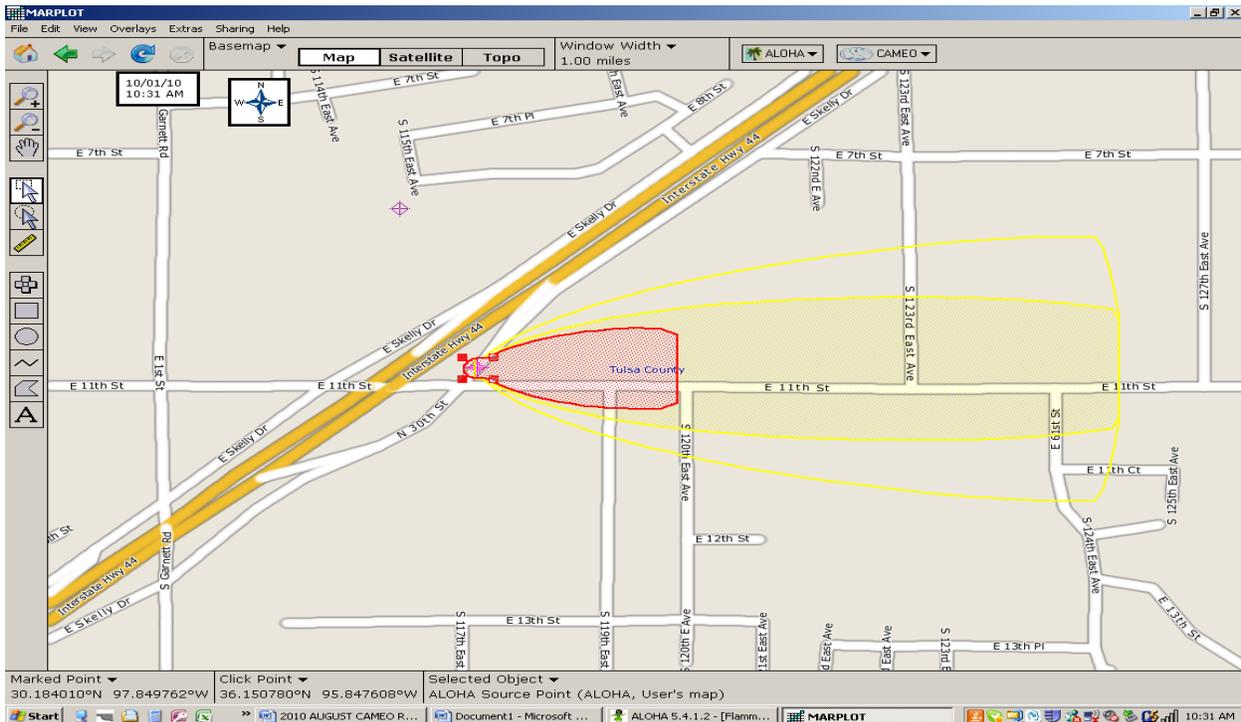
8. Save the file as “Dimethyl Ether ALOHA Direct Instant TOXIC.KML”

The ALOHA map objects have now been exported to the .KML file. This file may be imported to Google Earth.

9. Return to ALOHA and display the Threat Zone for a Flammable Zone. Notice it is slightly smaller than the Toxic area.

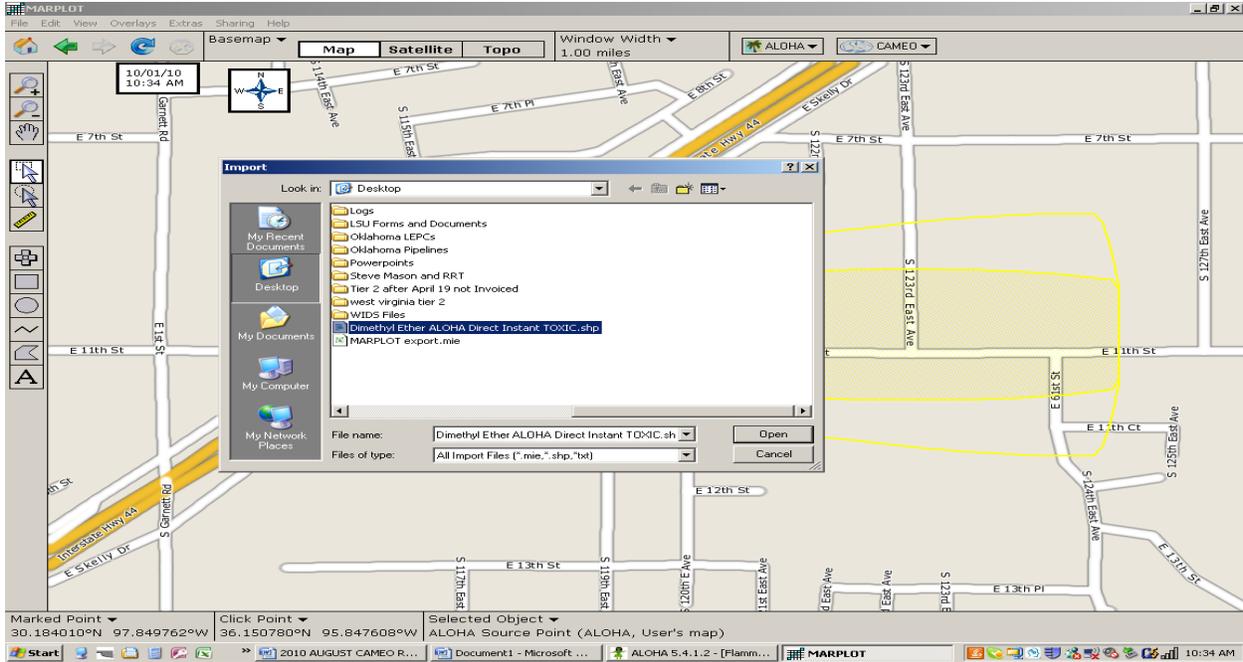


10. Display the Flammable Area Threat Zone on MARPLOT. Notice the original Toxic area has been replaced by the new Flammable area.

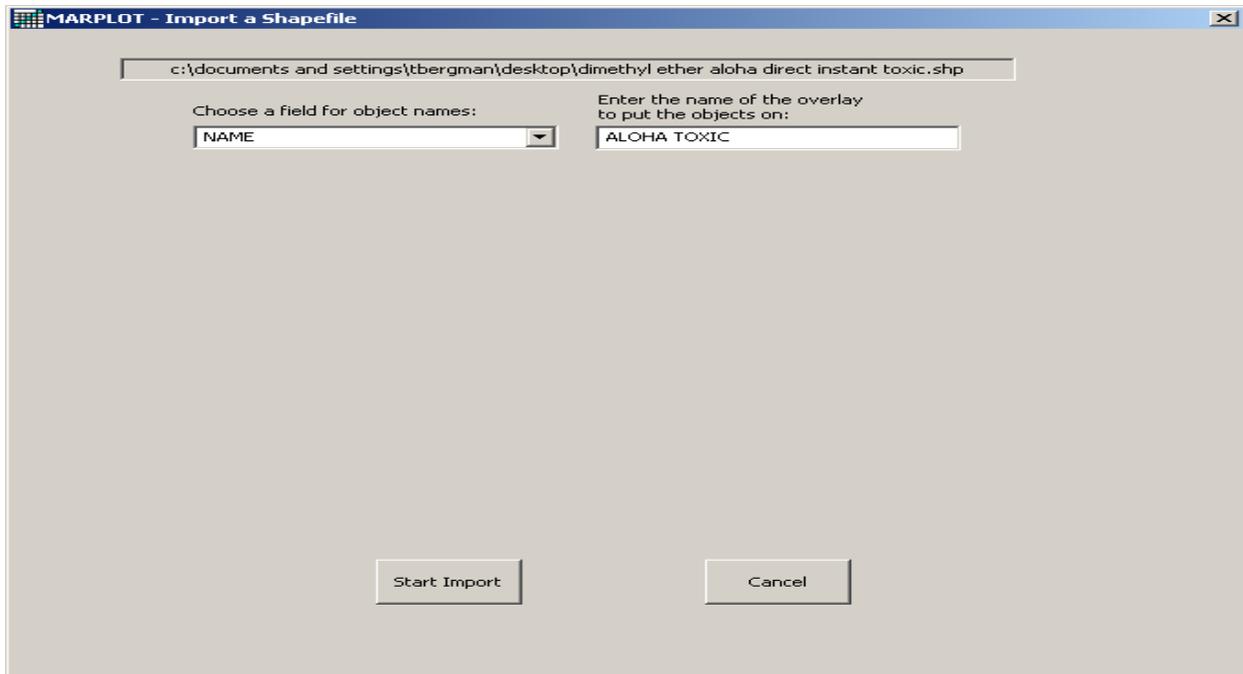


To Import the original Toxic area and compare to the new Flammable area in MARPLOT:

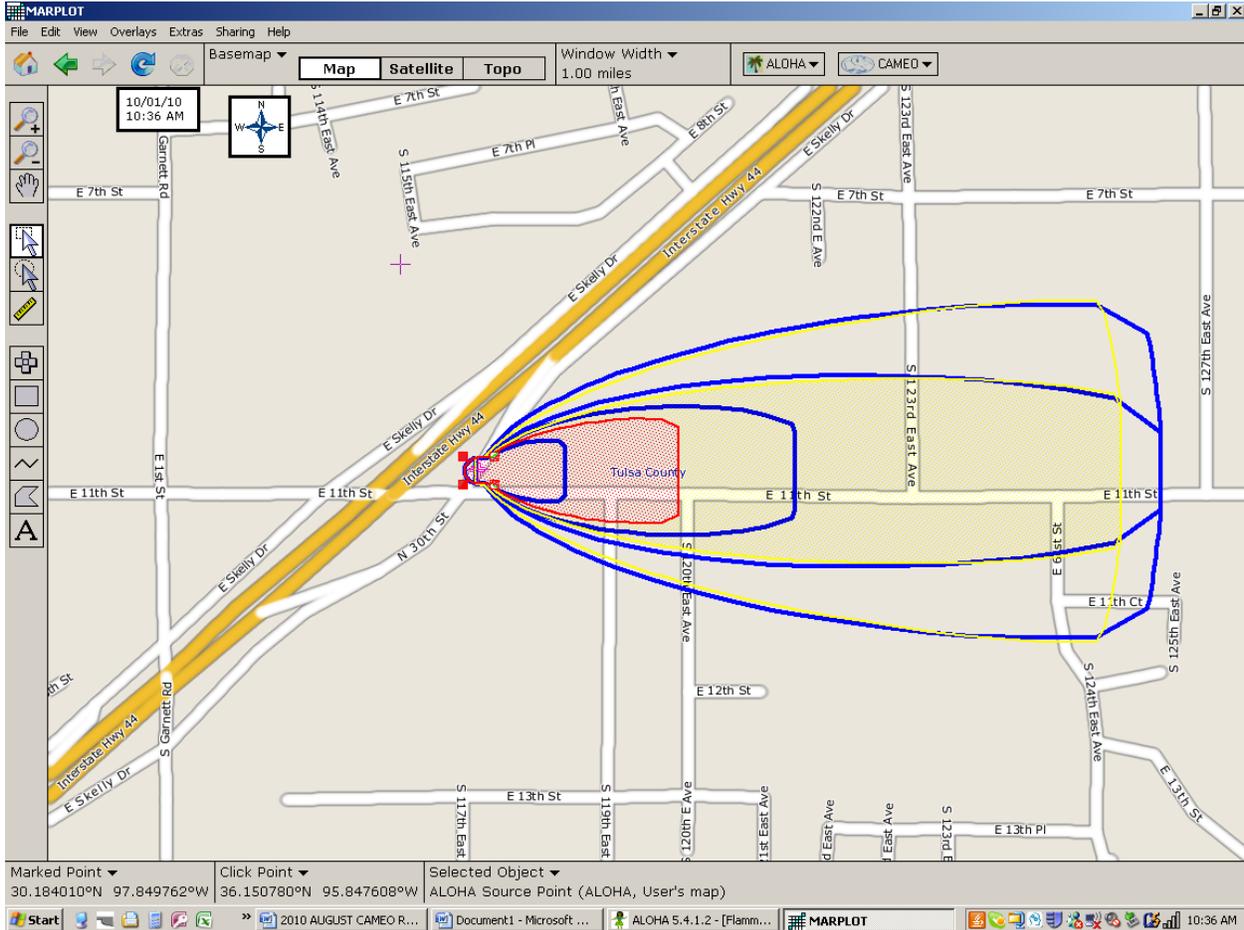
11. Select the File / Import as Overlay Objects menu; find and select the “Dimethyl Ether ALOHA Direct Instant TOXIC.shp” file



12. Select “NAME” and enter “ALOHA TOXIC” to the MARPLOT Import a Shapefile screen



Now both Threat Zones are displayed on the MARPLOT map.

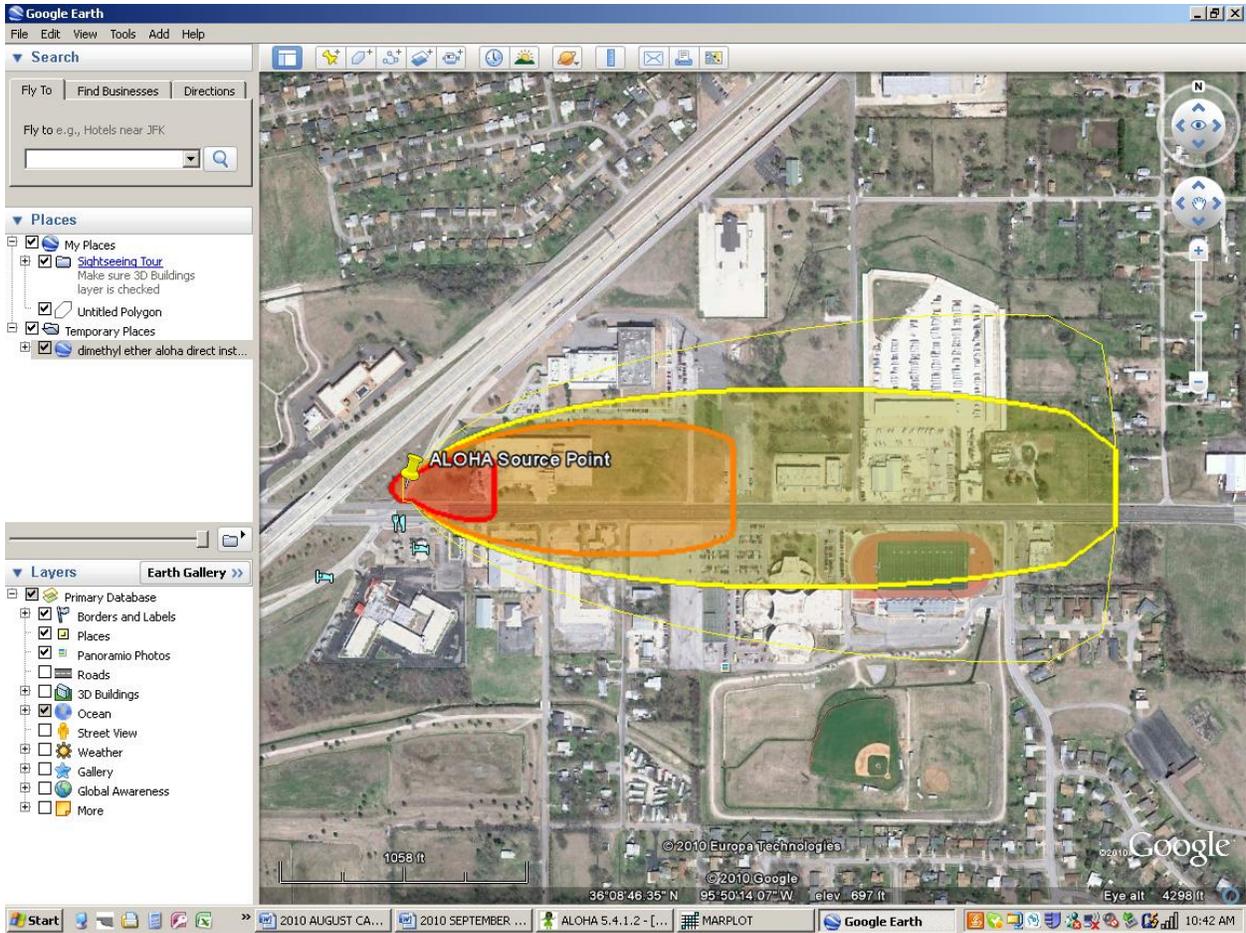


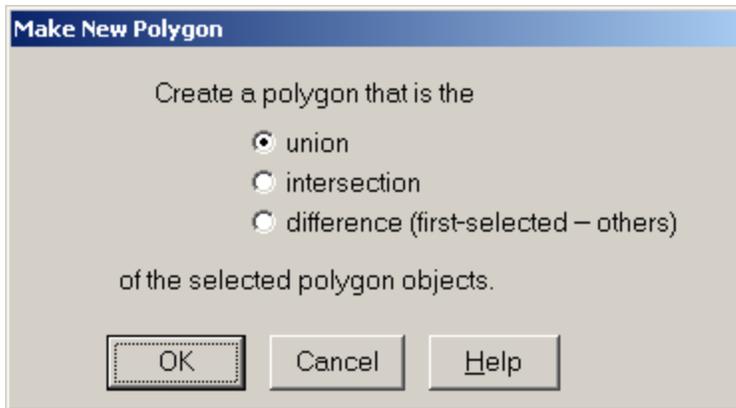
13. Select the MARPLOT View / Overlay Manager menu. Notice the new ALOHA TOXIC overlay that has been added. You can unlock the overlay and edit the imported ALOHA map objects as desired. You CANNOT edit any object residing on the ALOHA overlay.

YOU CAN REPEAT THE ABOVE STEPS AS MANY TIMES AS YOU WISH TO DISPLAY MULTIPLE ALOHA THREAT ZONES IN MARPLOT.

To Import the original Toxic area and compare to the new Flammable area in Google Earth:

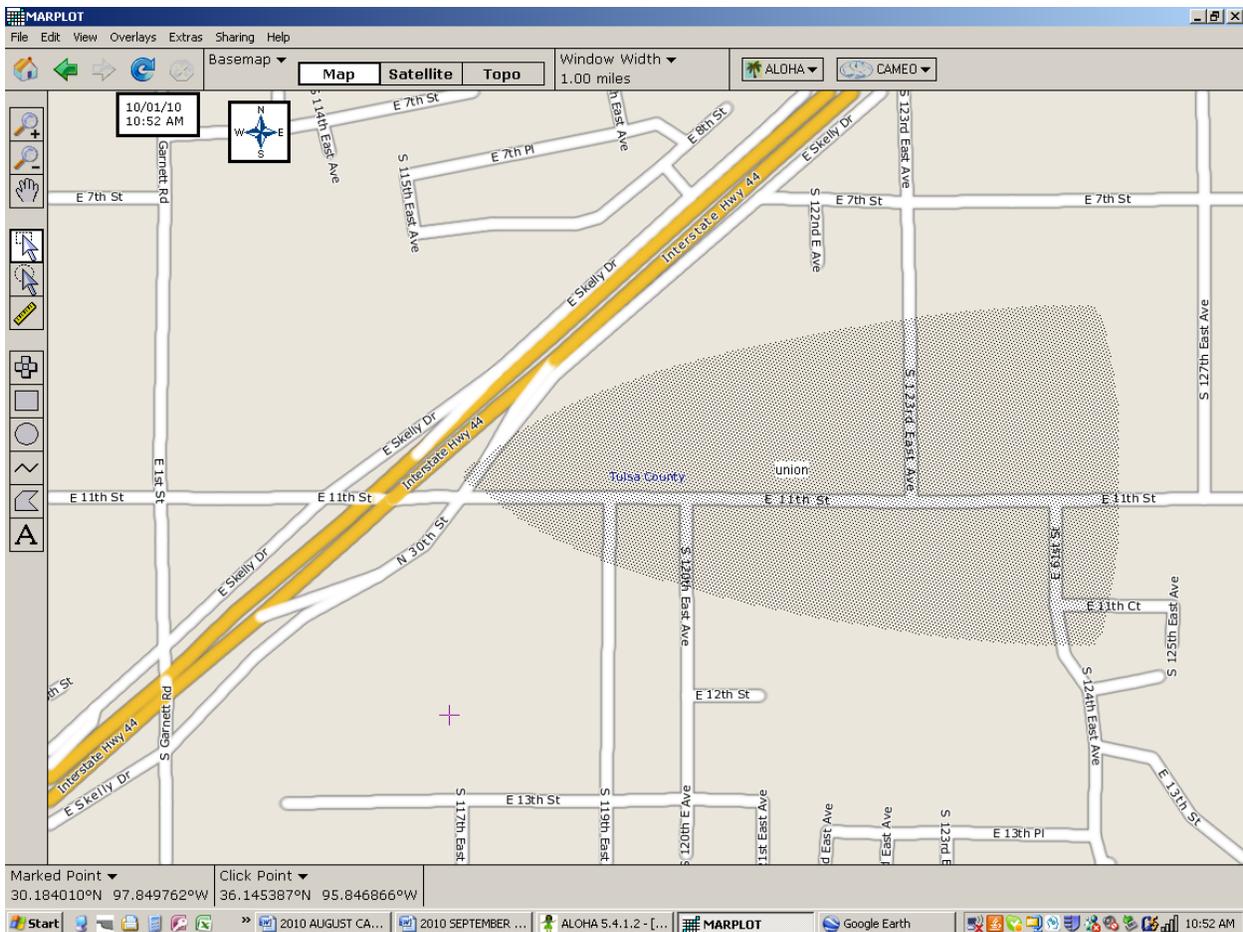
1. Launch Google Earth
2. Select the "File / Open" menu
3. Locate and double-click on the "Dimethyl Ether ALOHA Direct Instant TOXIC.KML"
4. This will display the ALOHA Toxic Threat Zone on the Google Earth map





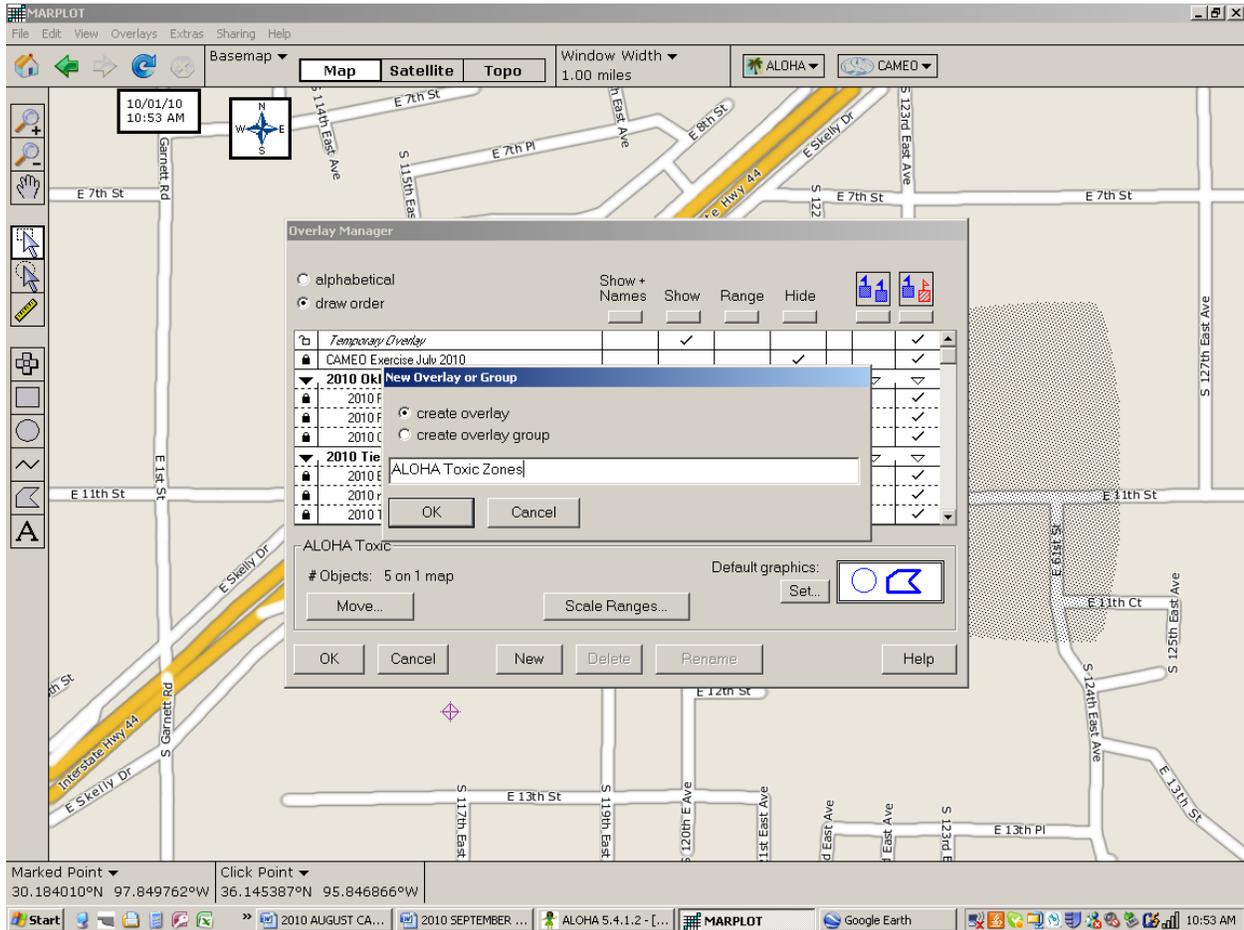
MARPLOT has combined the various ALOHA map objects into a single new object. To see only the new object:

5. Select the Sharing / ALOHA / Delete ALOHA Objects menu. The ALOHA map objects will disappear leaving only the newly created “union” object



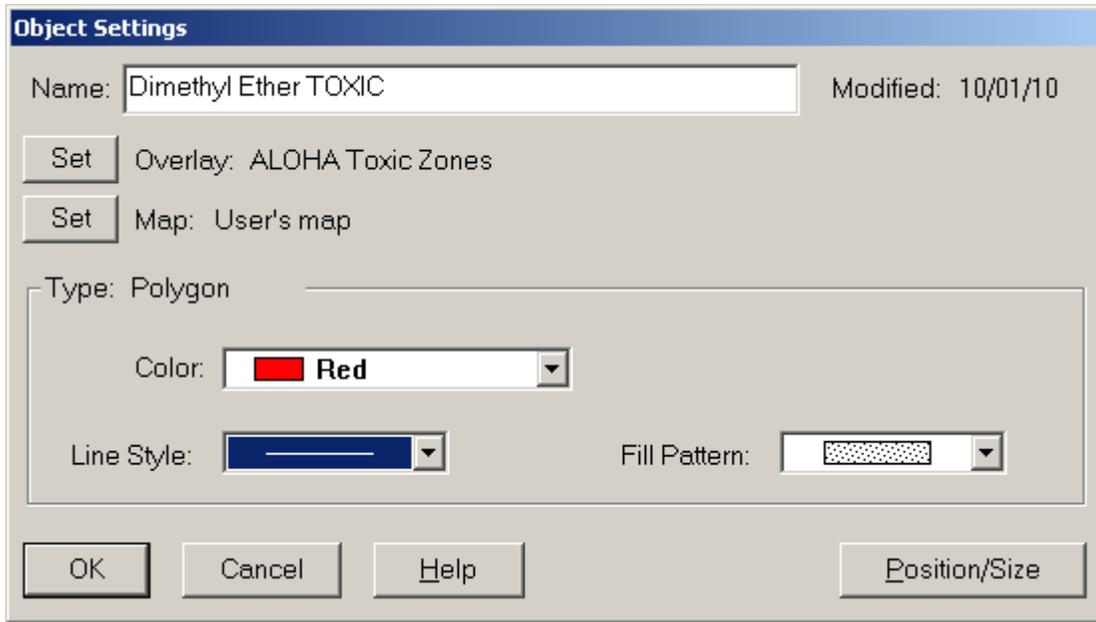
6. Select the View / Overlay Manager

7. Create a new Overlay named ALOHA Toxic Zones (CAMEO Companion page 74)

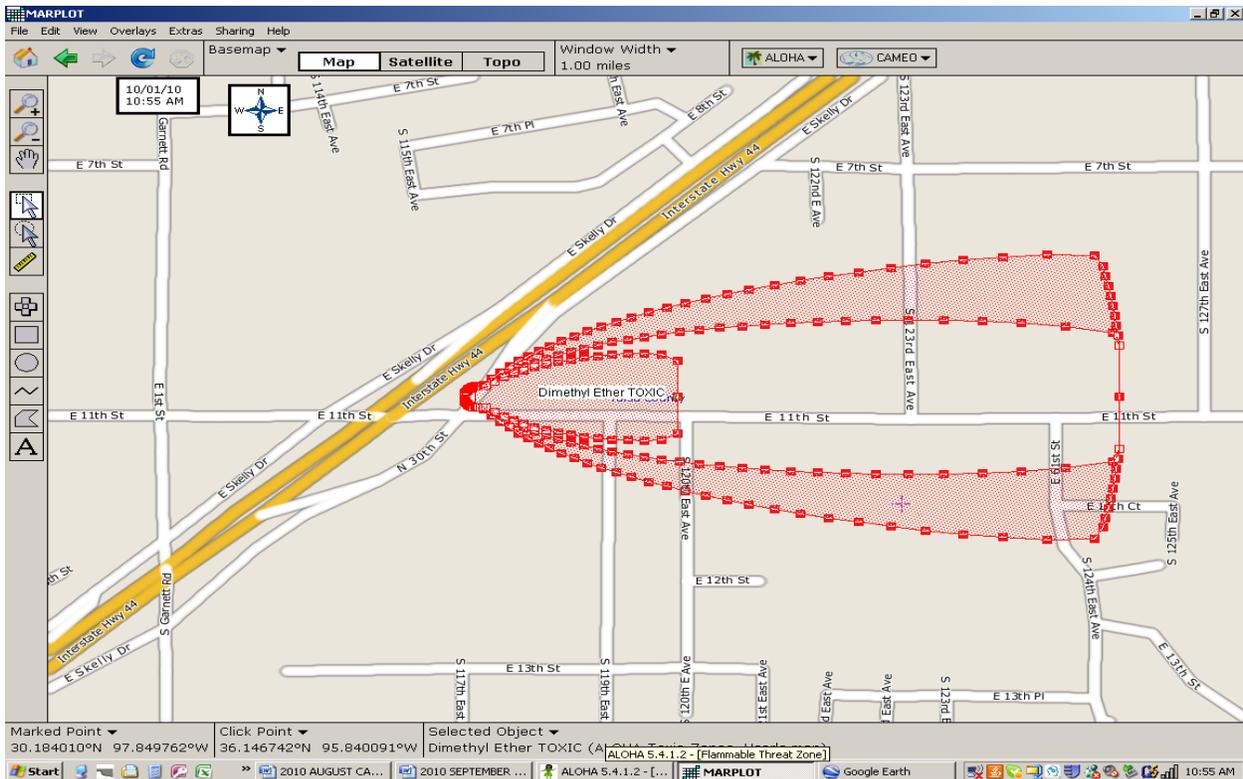


8. Select OK to close the Overlay Manager

9. Double-click on the “union” map object; change the Object Settings as below:



10. Your screen should look something like this.



Repeat steps as many times as necessary to display all desired ALOHA Threat Zones.