

## **CAMEO Refresher Exercise Set: December, 2012 Truck Collision Exercise**

### **Scenario:**

At 3:10 am on December 1, 2012, a multi-vehicle incident occurred on an Interstate Highway in your jurisdiction, including 3 vehicles with DOT HazMat placards. Responders have secured the immediate area, and have obtained some limited information on the materials using the ERG. The placards are:

UN # 1219

UN # 2014

UN # 2789

All 3 placarded vehicles appear to be leaking liquid product, but the size and location of the leaks are currently unknown. In addition, there are a number of damaged vehicles leaking what appears to be any number of products, including gasoline, diesel fuel, hydraulic fluids, anti-freeze, and even possibly battery acid.

Current weather conditions are as follows:

Wind: from the NNW; 8 mph with gusts to 14 mph (obtained from local airport)

Ground Roughness: open country

Cloud Cover: Clear Skies

Air Temperature: 72° F

Stability Class: D

No Inversion Height

Relative Humidity: 47%

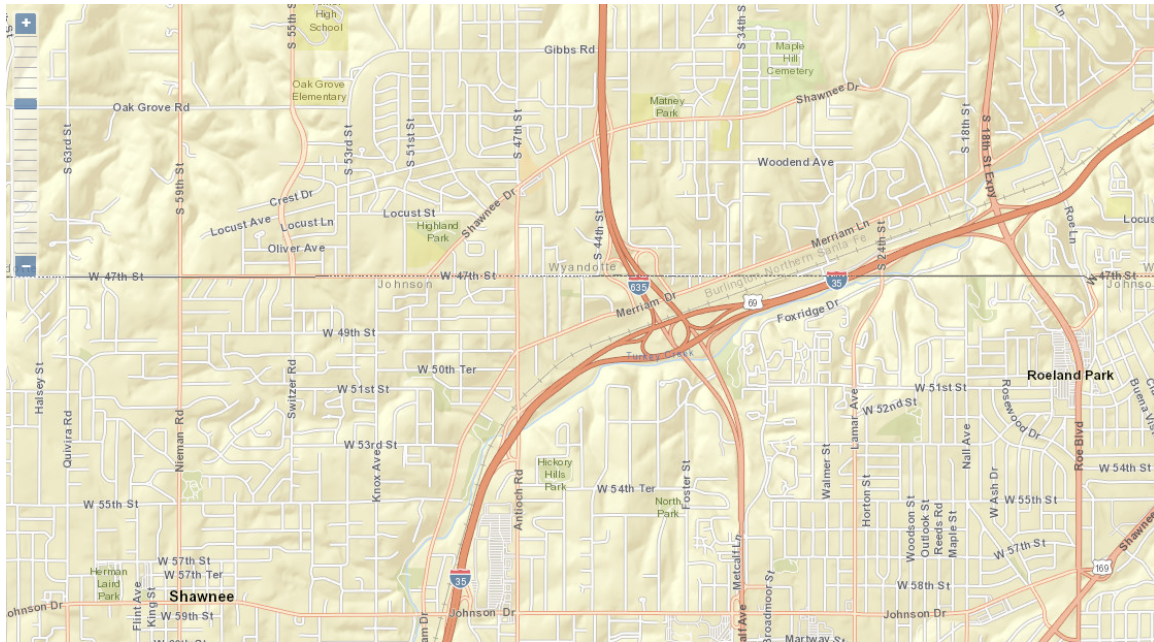
You are directed to operate CAMEO and supply information to Incident Command for the duration of this event.

### **CAMEO Chemicals**

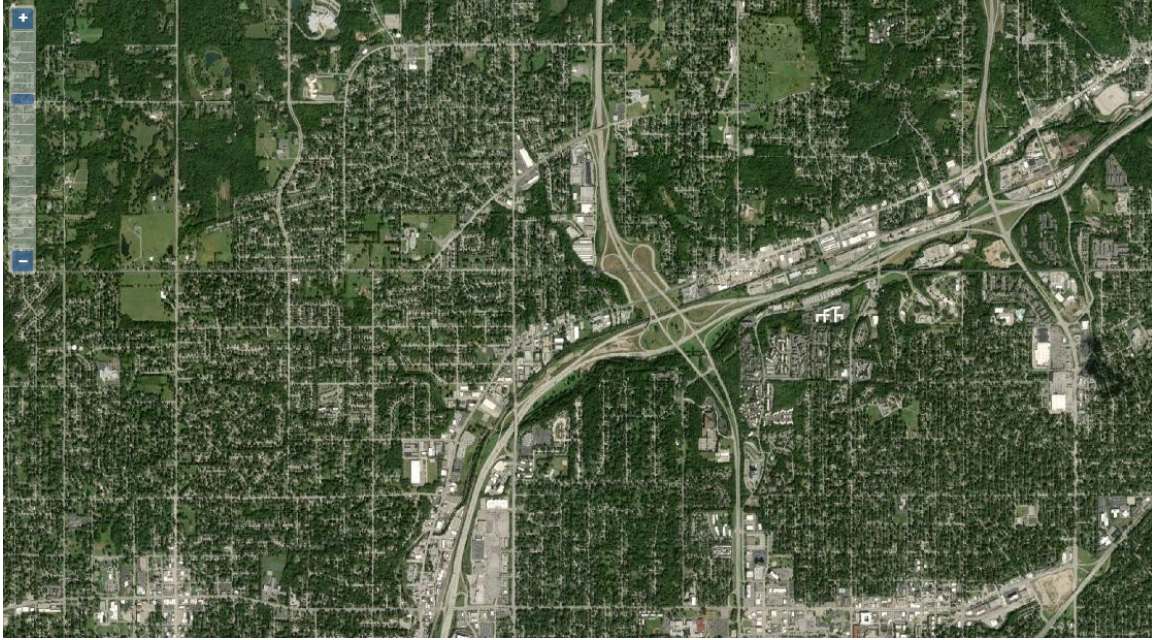
1. Use CAMEO Chemicals to gather information for the various chemicals.
  - a. Are these materials liquid, solid, or gas?
  - b. Is it likely that these materials are carried in Liquid Tankers or Pressurized Tankers?
  - c. What are the primary hazards associated with these materials?
2. Use the CAMEO Chemicals "Predict Reactivity" module to evaluate the potential reactive hazards for this incident.
3. Are any of these 3 materials incompatible with Gasoline, Diesel Fuel, Hydraulic Fluid, or Water? Show the MyChemicals List screenshot along with the expanded Reactivity Worksheet.
4. Determine the Initial Isolation Zone and Evacuation distances appropriate for this scenario.
5. Are any of these 3 materials able to be modeled using ALOHA?

# MARPLOT

1. Launch MARPLOT
2. Select a location in your area to use as the incident site
3. Navigate to the incident location Mark the incident location using the Symbol tool
4. Use the “Circle” drawing tool to display an Immediate Isolation Zone on the map
5. Use the “Polygon” drawing tool to display the largest ERG-suggestion downwind evacuation area
6. Copy and paste a screenshot of the mapped area from MARPLOT to WORD

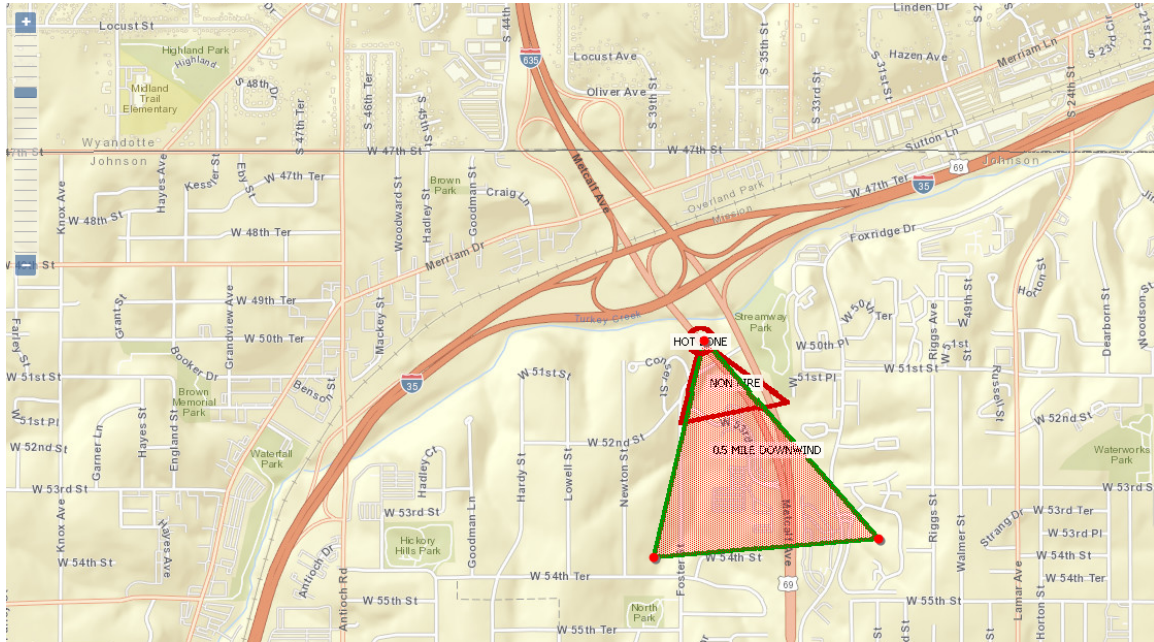


*This MARPLOT screenshot is the intersection of I-635 and I-35 in Overland Park KS. Your screenshot should be of an area in your jurisdiction.*

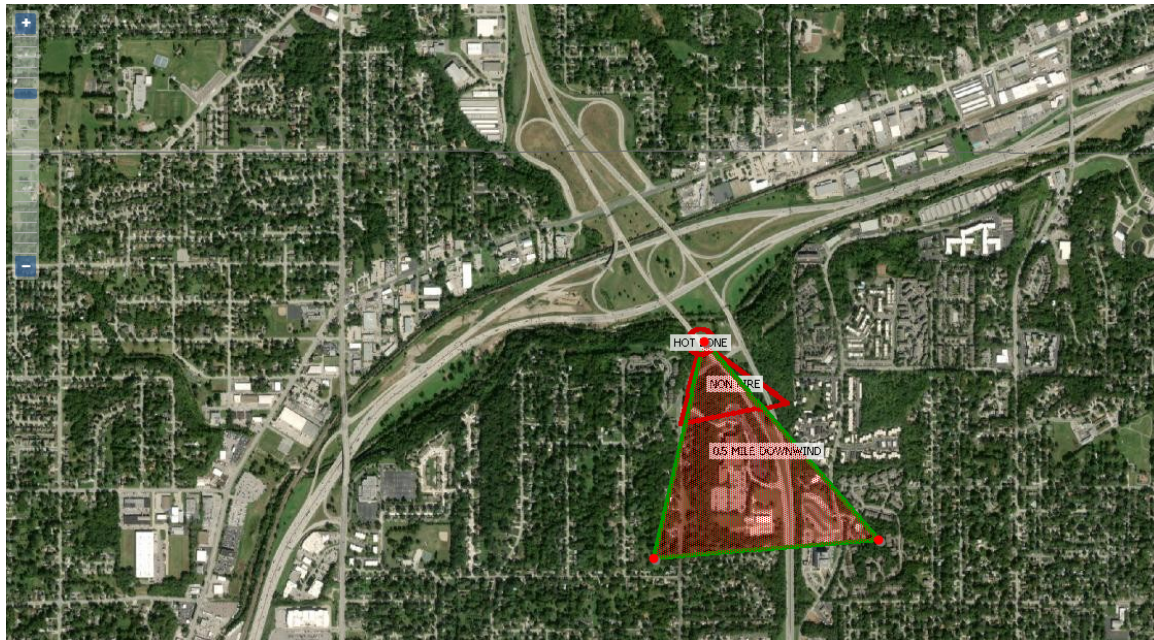


*This MARPLOT screenshot is the intersection of I-635 and I-35 in Overland Park KS. Your screenshot should be of an area in your jurisdiction.*





150 foot Immediate Isolation Area; 1000 foot non-Fire Evac Area; 0.5 mile Fire Evac area



150 foot Immediate Isolation Area; 1000 foot non-Fire Evac Area; 0.5 mile Fire Evac area

**POPULATION ESTIMATES:**

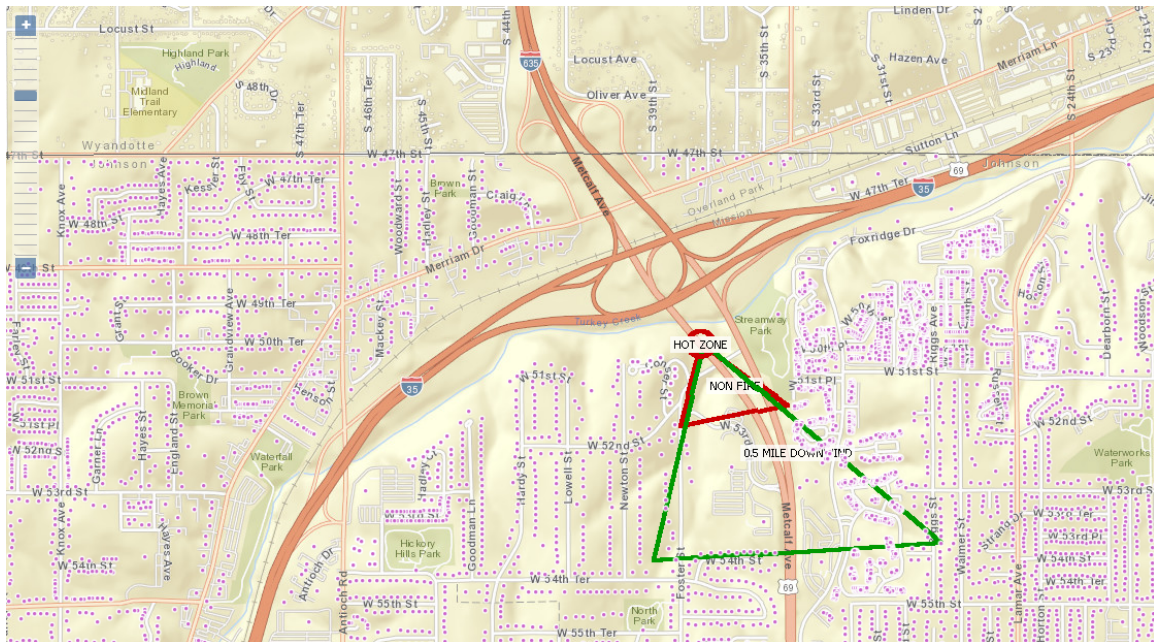
For 150 foot Isolation Zone:	0
For 1000 foot Evac Area:	0
For 0.5 mile Evac Area:	420



*Your population numbers should be different than these because these are for the OKC area shown in the MARPLOT screensho*

### OVERLAND PARK ADDRESS POINTS IN THIS AREA

*Note: this part of the exercise can be done ONLY if you have imported a local “address points” shape file to your MARPLOT; I have the address points for OVERLAND PARK in my MARPLOT, and can thus access a list of addresses for any displayed map area*



*MARPLOT screenshot with address points displayed*

MARPLOT

Object List (Search Results)

1 - 100 of 290 results < Prev Next > Page 1 of 3 Go to page [ ] Go Show 100 objects per page

Show All On Map 2021 JOHNSON ADDRESS (290 objects) Export Objects Copy Table Criteria: Search for objects inside of or touching the selected objects on the 2021 JOHNSON ADDRESS layer Found: 290 objects on 1 layer

Graphic	STEWARD	L_UPDATE	EFF_DATE	EXP_DATE	ADDID	STATE	COUNTY	MUNI	HNO	HHS	PRM	PRD	STP	RD	STS	POD	POM	ESN	MSAGCO	POSTCO	ZIP	ZIP4
-	Johnson County Emergency Communications Data Steward	20140101	20140101	0	19900000000012637	KS	JOHNSON COUNTY	OVERLAND PARK	5200					METCALF AVE				112	OVERLAND PARK	OVERLAND PARK	66202	
-	Johnson County Emergency Communications Data Steward	20140101	20140101	0	19900000000012638	KS	JOHNSON COUNTY	OVERLAND PARK	5221					FOSTER ST				112	OVERLAND PARK	OVERLAND PARK	66202	
-	Johnson County Emergency Communications Data Steward	20140101	20140101	0	19900000000041111	KS	JOHNSON COUNTY	OVERLAND PARK	5223					FOSTER ST				112	OVERLAND PARK	OVERLAND PARK	66202	
-	Johnson County Emergency Communications Data Steward	20140101	20140101	0	19900000000012641	KS	JOHNSON COUNTY	OVERLAND PARK	5225					FOSTER ST				112	OVERLAND PARK	OVERLAND PARK	66202	
-	Johnson County Emergency Communications Data Steward	20080129	20140101	0	200302251358014735	KS	JOHNSON COUNTY	MISSION	5240	1A				FOXRIDGE DR				108	MISSION	MISSION	66202	
-	Johnson County Emergency Communications Data Steward	20080129	20140101	0	200801290951407684	KS	JOHNSON COUNTY	MISSION	5240	1B				FOXRIDGE DR				108	MISSION	MISSION	66202	
-	Johnson County Emergency Communications Data Steward	20080129	20140101	0	200801290951459929	KS	JOHNSON COUNTY	MISSION	5240	1C				FOXRIDGE DR				108	MISSION	MISSION	66202	
-	Johnson County Emergency Communications Data Steward	20080129	20140101	0	200801290951412072	KS	JOHNSON COUNTY	MISSION	5240	1D				FOXRIDGE DR				108	MISSION	MISSION	66202	

MARPLOT screenshot following address points Search

ADDRESS POINTS.xlsx - Excel

File Home Insert Page Layout Formulas Data Review View PDF Architect 6 Creator Tell me what you want to do... Bergman, Tom Share

Clipboard Font Alignment Number Styles Cells Editing

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	LABEL	COUNTY	MUNI	ESN	MSAGCO	POSTCO	ZIP	UNIT	LONG	LAT											
2	5200 METCALF AVE	JOHNSON	OVERLAND	112	OVERLAND	OVERLAND	66202		-94.6703	39.03395											
3	5221 FOSTER ST	JOHNSON	OVERLAND	112	OVERLAND	OVERLAND	66202		-94.6722	39.03466											
4	5223 FOSTER ST	JOHNSON	OVERLAND	112	OVERLAND	OVERLAND	66202		-94.6722	39.03438											
5	5225 FOSTER ST	JOHNSON	OVERLAND	112	OVERLAND	OVERLAND	66202		-94.6721	39.03393											
6	5240 FOXRIDGE DR APT 1A	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 1A	-94.6662	39.03446											
7	5240 FOXRIDGE DR APT 1B	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 1B	-94.6662	39.03442											
8	5240 FOXRIDGE DR APT 1C	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 1C	-94.6662	39.03437											
9	5240 FOXRIDGE DR APT 1D	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 1D	-94.6662	39.03433											
10	5240 FOXRIDGE DR APT 2A	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 2A	-94.6663	39.03447											
11	5240 FOXRIDGE DR APT 2B	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 2B	-94.6663	39.03442											
12	5240 FOXRIDGE DR APT 2C	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 2C	-94.6663	39.03437											
13	5240 FOXRIDGE DR APT 2D	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 2D	-94.6663	39.03432											
14	5240 FOXRIDGE DR APT 3A	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 3A	-94.6664	39.03443											
15	5240 FOXRIDGE DR APT 3B	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 3B	-94.6664	39.03437											
16	5244 FOXRIDGE DR APT 1A	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 1A	-94.6662	39.03429											
17	5244 FOXRIDGE DR APT 1B	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 1B	-94.6662	39.03426											
18	5244 FOXRIDGE DR APT 1C	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 1C	-94.6662	39.03423											
19	5244 FOXRIDGE DR APT 1D	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 1D	-94.6663	39.03421											
20	5244 FOXRIDGE DR APT 2A	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 2A	-94.6663	39.03428											
21	5244 FOXRIDGE DR APT 2B	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 2B	-94.6663	39.03424											
22	5244 FOXRIDGE DR APT 2C	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 2C	-94.6663	39.03422											
23	5244 FOXRIDGE DR APT 2D	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 2D	-94.6663	39.0342											
24	5244 FOXRIDGE DR APT 3A	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 3A	-94.6664	39.03427											
25	5244 FOXRIDGE DR APT 3B	JOHNSON	MISSION	108	MISSION	MISSION	66202	APT 3B	-94.6664	39.03422											
26	5245 FOSTER ST	JOHNSON	OVERLAND	112	OVERLAND	OVERLAND	66202		-94.672	39.03349											
27	5250 FOXRIDGE DR	JOHNSON	MISSION	108	MISSION	MISSION	66202		-94.6665	39.0341											
28	5280 FOXRIDGE DR	JOHNSON	MISSION	108	MISSION	MISSION	66202		-94.6668	39.03349											

MARPLOT Basemap address points exported to an EXCEL spreadsheet



# ALOHA

1. Determine which, if any, of these materials can be modeled using ALOHA.
  - a. For the first ALOHA scenario, use Acetic Acid
  - b. Model for the Toxic, Vapor Cloud Explosion, and BLEVE zones
  - c. Repeat for the other substances
2. Use the following weather data:

## ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 14 miles/hour from NNW at 3 meters

Ground Roughness: open country      Cloud Cover: 0 tenths

Air Temperature: 72° F      Stability Class: D

No Inversion Height      Relative Humidity: 47%

3. Use the following Tank dimensions for all 3 products:
  - a. Horizontal cylinder; 30 feet long, 8000 gallon capacity

Tank Size and Orientation

Select tank type and orientation:

Horizontal cylinder       Vertical cylinder       Sphere

Enter two of three values:

diameter   feet     meters

length   gallons     cu feet

volume

- b. Liquid product at ambient temperature

Chemical State and Temperature

Enter state of the chemical:

Tank contains liquid

Tank contains gas only

Unknown

Enter the temperature within the tank:

Chemical stored at ambient temperature

Chemical stored at  degrees  F     C

- c. Tank is 90% full

Liquid Mass or Volume

Enter the mass in the tank OR volume of the liquid

The mass in the tank is:   pounds  
 tons(2,000 lbs)  
 kilograms

OR

Enter liquid level OR volume

The liquid volume is:   gallons  
 cubic feet  
 liters  
 cubic meters

% full by volume

d. Tank is leaking but not burning

Type of Tank Failure

Scenario:  
 Tank containing an unpressurized flammable liquid.

Type of Tank Failure:

Leaking tank, chemical is not burning and forms an evaporating puddle  
 Leaking tank, chemical is burning and forms a pool fire  
 BLEVE, tank explodes and chemical burns in a fireball

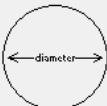
Potential hazards from flammable chemical which is not burning as it leaks from tank:

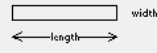
- Downwind toxic effects
- Vapor cloud flash fire
- Overpressure (blast force) from vapor cloud explosion

e. Hole size is 2" short pipe or valve

Area and Type of Leak

Select the shape that best represents the shape of the opening through which the pollutant is exiting

  Circular opening

  Rectangular opening

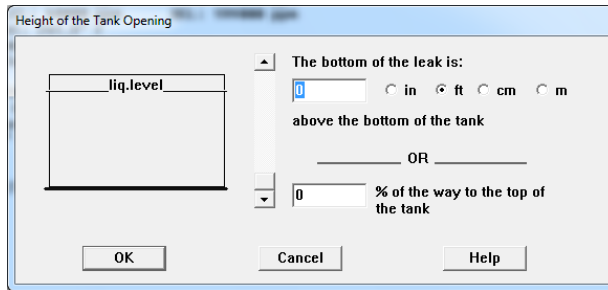
Opening diameter:   inches  
 feet  
 centimeters  
 meters

Is leak through a hole or short pipe/valve?

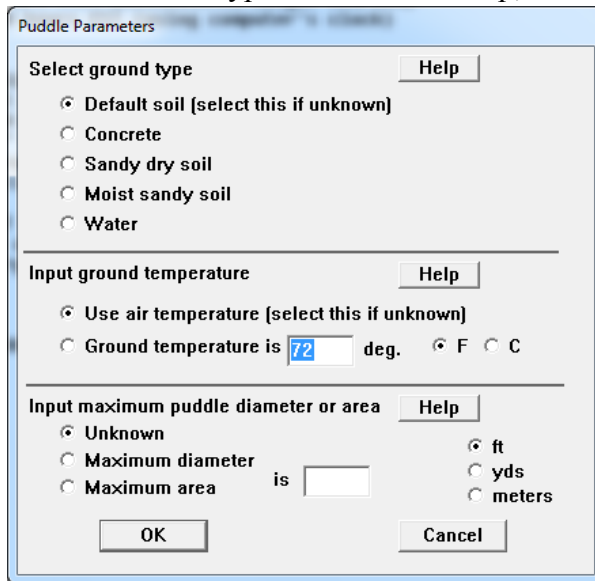
Hole  Short pipe/valve



f. Leak is located on the bottom of the tank



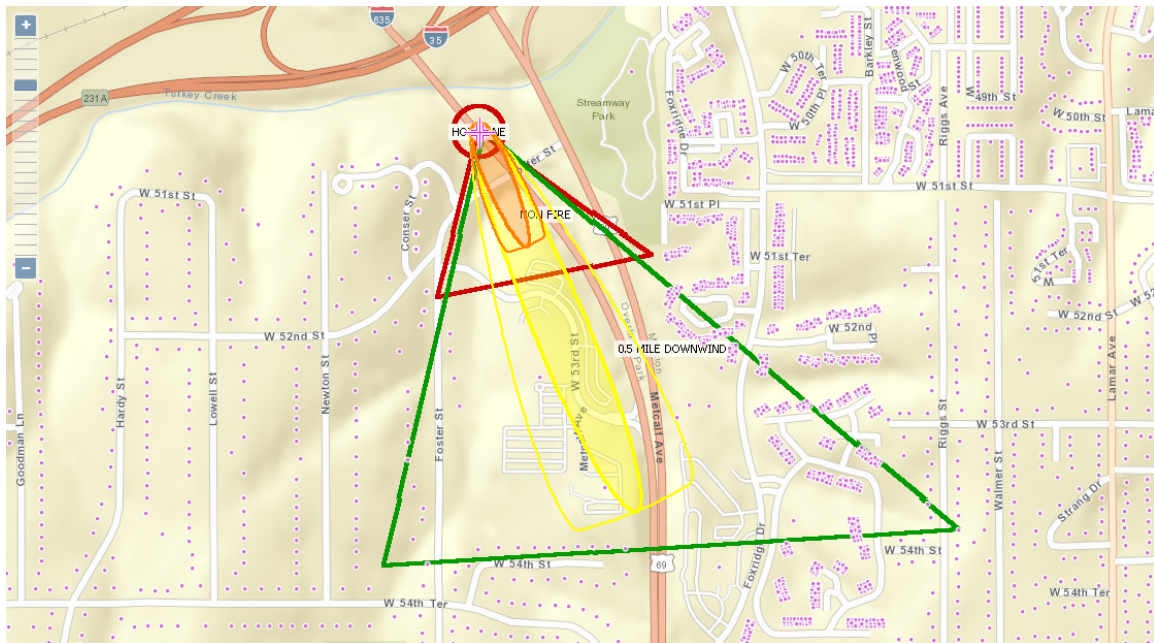
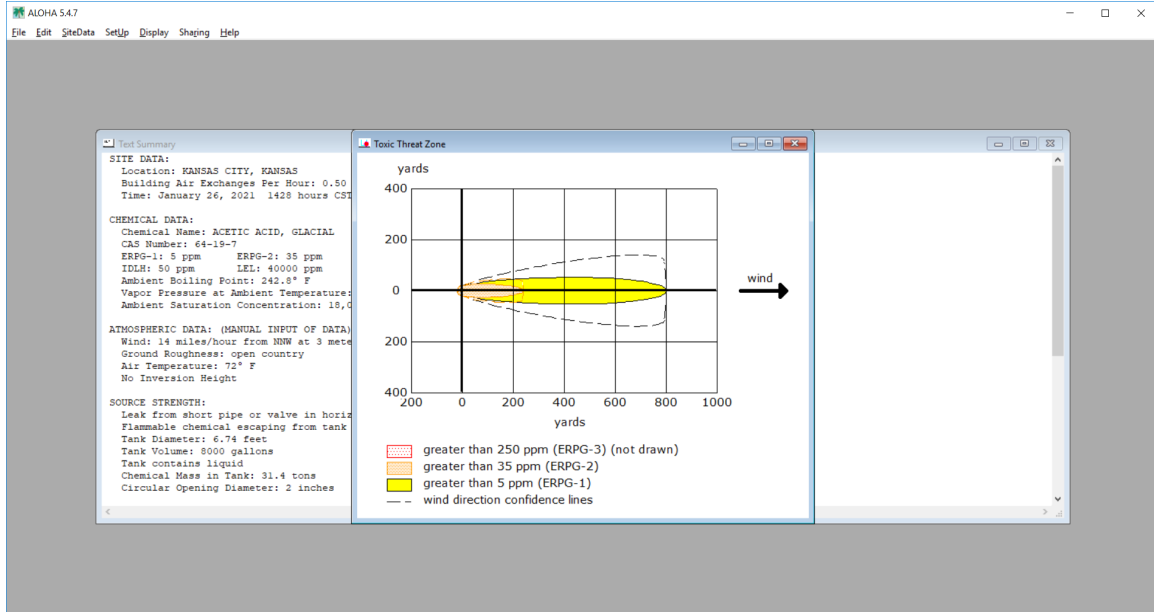
g. Default for Soil Type and Ground Temp; Puddle Size is Unknown



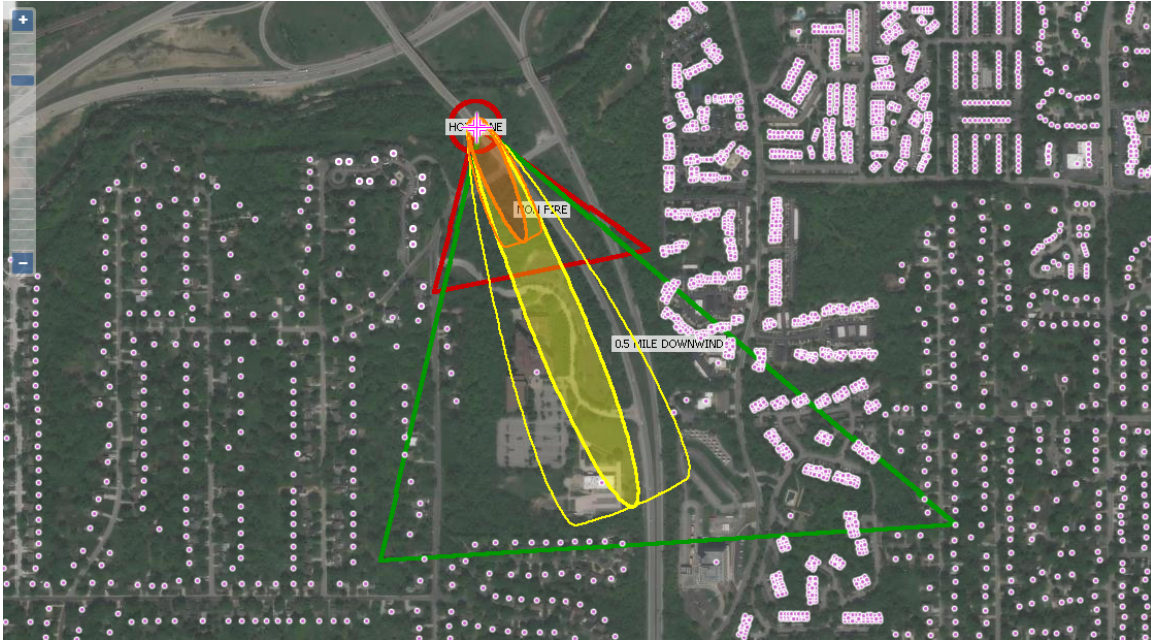
4. SOURCE STRENGTH:

5. Leak from short pipe or valve in horizontal cylindrical tank
6. Flammable chemical escaping from tank (not burning)
7. Tank Diameter: 6.74 feet      Tank Length: 30 feet
8. Tank Volume: 8000 gallons
9. Tank contains liquid      Internal Temperature: 72° F
10. Chemical Mass in Tank: 31.4 tons      Tank is 90% full
11. Circular Opening Diameter: 2 inches
12. Opening is 0 feet from tank bottom
13. Ground Type: Default soil
14. Ground Temperature: equal to ambient
15. Max Puddle Diameter: Unknown
16. Release Duration: ALOHA limited the duration to 1 hour
17. Max Average Sustained Release Rate: 56.9 pounds/min
18. (averaged over a minute or more)
19. Total Amount Released: 2,018 pounds
20. Note: The chemical escaped as a liquid and formed an evaporating puddle.
21. The puddle spread to a diameter of 40 yards.

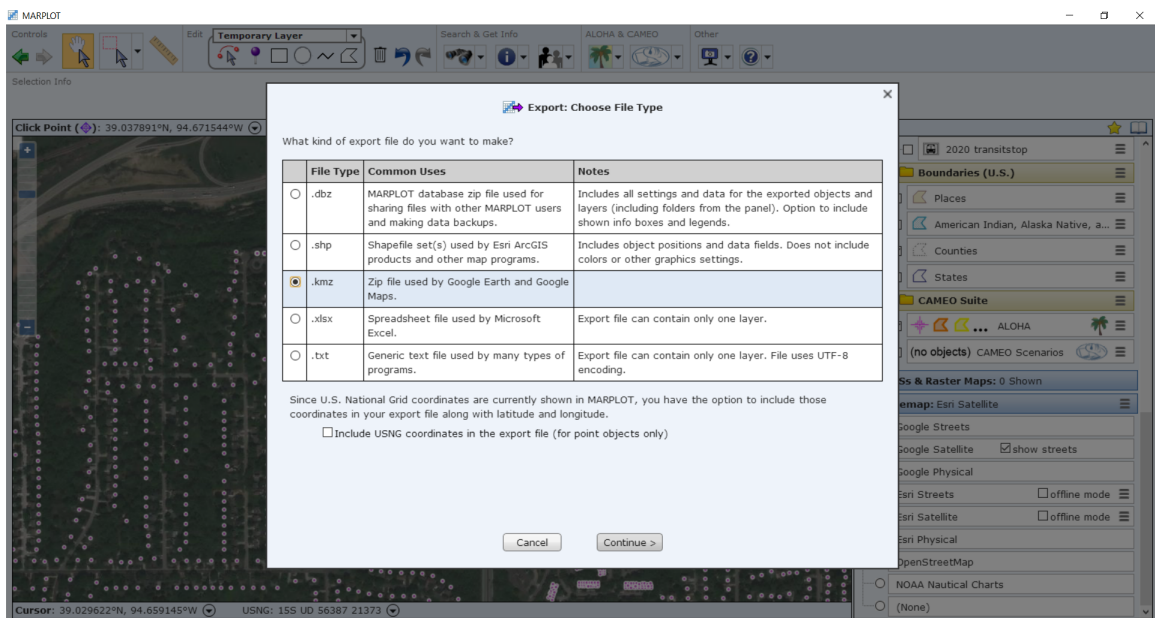
## Display the Threat Zone for the Toxic Area (*Acetic Acid*)



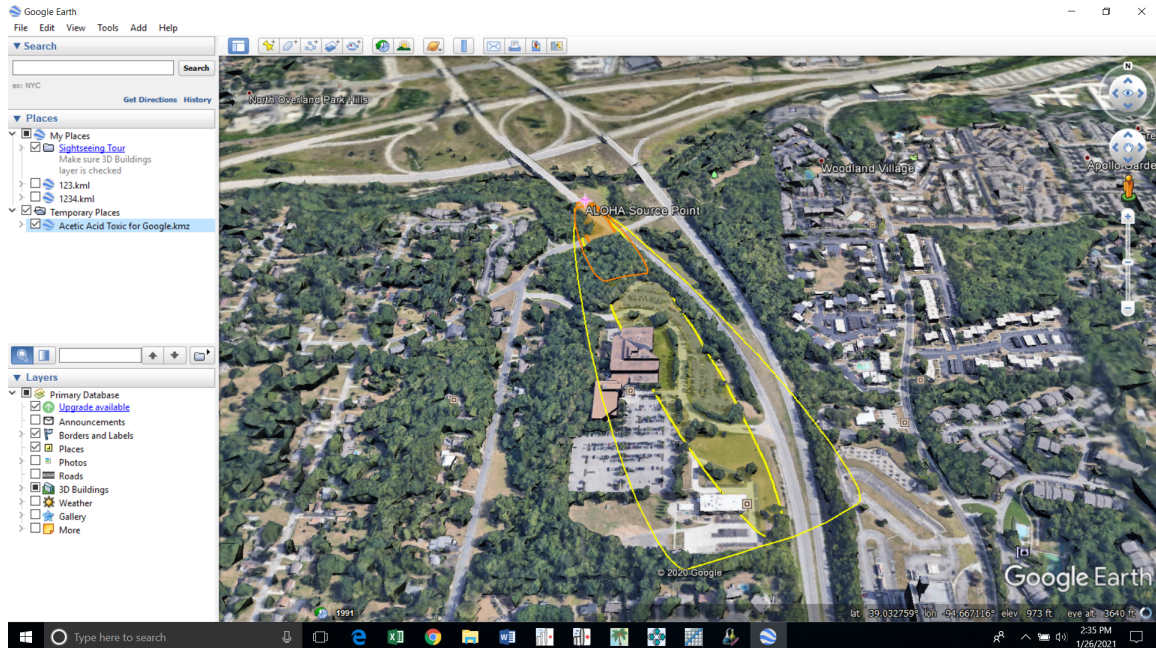




22. Select the ALOHA Layer menu and choose Export Layer
23. Select kmz as the file type



24. name the file "Acetic Acid Toxic for Google"; Save the kmz file
25. navigate to the save kmz file and double click on it, this should automatically open Google Earth and display the Threat Zone



26. Repeat the above processes for the Isopropanol and the Hydrogen Peroxide resulting in the following:
- Toxic Threat Zone for each product
  - VCE Threat Zone for each product
  - All Toxic and VCE Threat Zones displayed on both MARPLOT and Google Earth



**ANSWERS:**

UN # 1219                      Isopropanol  
UN # 2014                      Hydrogen Peroxide, Aqueous Solution  
UN # 2789                      Acetic Acid, Glacial

**CAMEO Chemicals**

1. Use CAMEO Chemicals to gather information for the various chemicals. (CAMEO Companion pages 31-34)
  - a. Are these materials liquid, solid, or gas? **ALL ARE LIQUIDS**
  - b. Is it likely that these materials are carried in Liquid Tankers or Pressurized Tankers? **ALL WOULD LIKELY SHIP IN LIQUID TANKERS**
  - c. What are the primary hazards associated with these materials?  
**ISOPROPANOL: FLAMMABLE**  
**HYDROGEN PEROXIDE: HEALTH AND OXIDIZER**  
**ACETIC ACID: TOXIC AND FLAMMABLE**
  
2. Use the CAMEO Chemicals “Predict Reactivity” module to evaluate the potential reactive hazards for this incident. (CAMEO Companion pages 34-35)

	ACETIC ACID, GLACIAL	
ISOPROPANOL	Heat generation Intense reaction	ISOPROPANOL
HYDROGEN PEROXIDE, AQUEOUS SOLUTION, WITH NOT LESS THAN 20% BUT NOT MORE THAN 60% HYDROGEN PEROXIDE (STABILIZED AS NECESSARY)	Combustion-enhancing gas Corrosive Explosive Flammable Flammable gas Heat generation Toxic Toxic gas	Explosive Flammable Heat generation Toxic gas

3. Are any of these 3 materials incompatible with Gasoline, Diesel Fuel, Hydraulic Fluid, or Water? Show the MyChemicals List screenshot along with the Reactivity Worksheet screenshot. **THE ACETIC ACID IS POTENTIALLY WATER-REACTIVE. THE HYDROGEN PEROXIDE POTENTIALLY REACTS WITH ANY OF THE OTHER MATERIALS.**

**MyChemicals**

***MyChemicals Collection***

1. [ACETIC ACID, GLACIAL](#) [Remove](#)

2.	<a href="#">ISOPROPANOL</a>	Remove
3.	<a href="#">HYDROGEN PEROXIDE, AQUEOUS SOLUTION, WITH NOT LESS THAN 20% BUT NOT MORE THAN 60% HYDROGEN PEROXIDE (STABILIZED AS NECESSARY)</a>	Remove
4.	<a href="#">Water</a>	Remove
5.	<a href="#">GASOLINE</a>	Remove
6.	<a href="#">FUEL OIL, [DIESEL]</a>	Remove
7.	<a href="#">BRAKE FLUID, HYDRAULIC</a>	Remove

Add Water Add Reactive Group

ACETIC ACID, GLACIAL					
ISOPROPANOL	Heat generation Intense reaction	ISOPROPANOL			
HYDROGEN PEROXIDE, AQUEOUS SOLUTION, WITH NOT LESS THAN 20% BUT NOT MORE THAN 60% HYDROGEN PEROXIDE (STABILIZED AS NECESSARY)	Combustion-enhancing gas Corrosive Explosive Flammable Flammable gas Heat generation Toxic Toxic gas	Explosive Flammable Heat generation Toxic gas	HYDROGEN PEROXIDE, AQUEOUS SOLUTION, WITH NOT LESS THAN 20% BUT NOT MORE THAN 60% HYDROGEN PEROXIDE (STABILIZED AS NECESSARY)		
Water	Corrosive		Combustion-enhancing gas Corrosive Heat generation Intense reaction Toxic gas	Water	
GASOLINE			Explosive Flammable Heat generation Nonflammable, nontoxic gas Toxic gas		GASOLINE

FUEL OIL, [DIESEL]			Explosive Flammable Heat generation Nonflammable, nontoxic gas Toxic gas			FUEL OIL, [DIESEL]
BRAKE FLUID, HYDRAULIC			Explosive Flammable Heat generation Nonflammable, nontoxic gas Toxic gas			

4. Determine the Initial Isolation Zone and Evacuation distances appropriate for this scenario. (CAMEO Companion pages 31-34) **THE ERG PROTECTIVE DISTANCES ARE NOW INCLUDED ON THE CAMEO CHEMICALS "DATASHEET". SCROLL DOWN THE DATASHEET TO THE "RESPONSE RECOMMENDATIONS" SECTION TO VIEW THE ERG-REFERENCED INFORMATION.**

#### ACETIC ACID DATASHEET EXCERPT

##### *Response Recommendations*

[What is this information?](#) ►

##### **Isolation and Evacuation**

Excerpt from [GUIDE 132](#) [Flammable Liquids - Corrosive]:

As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.

SPILL: Increase, in the downwind direction, as necessary, the isolation distance shown above.

FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2012)

#### ISOPROPANOL DATASHEET EXCERPT

## Response Recommendations

[What is this information?](#) ▶

### Isolation and Evacuation

Excerpt from [GUIDE 129](#) [Flammable Liquids (Polar / Water-Miscible / Noxious)]:

As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.

LARGE SPILL: Consider initial downwind evacuation for at least 300 meters (1000 feet).

FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2012)

## HYDROGEN PEROXIDE DATASHEET EXCERPT

## Response Recommendations

[What is this information?](#) ▶

### Isolation and Evacuation

Excerpt from [GUIDE 140](#) [Oxidizers]:

As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.


LARGE SPILL: Consider initial downwind evacuation for at least 100 meters (330 feet).

FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2012)


**FROM THE ABOVE DATASHEET INFORMATION, THE LARGEST RECOMMENDED ISOLATION ZONE IS 150 FEET, LARGEST DOWNWIND EVACUATION AREA IS 1000 FEET. IF THERE IS A POTENTIAL FOR "FIRE", EVACUATION AREA OF ½ MILE IS SUGGESTED.**

5. Are any of these 3 materials able to be modeled using ALOHA? **ALL 3 MATERIALS CAN BE MODELED USING ALOHA, AS EVIDENCED BY THE "ALOHA ICON" DISPLAYED NEXT TO THE CAS NUMBER ON EACH DATASHEET.**

CAS Number

64-19-7 

CAS Number

67-63-0 

CAS Number

7722-84-1 