

CAMEO Refresher Exercise Set: January, 2021

CAMEO Suite: Fixed Facility Incident

Scenario:

A local facility is reporting a release of a material named “FLUORHYDRIC ACID”. A review of the facility Tier 2 report shows that the material is a 50% solution stored in a 2000 gallon, outdoor tank. The best estimate is the tank has a 10 x 12 yard containment area. There is a diesel fuel tank and some 55-gallon drums of a caustic soda solution nearby, but not in the same containment area.

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

CAMEO Chemicals

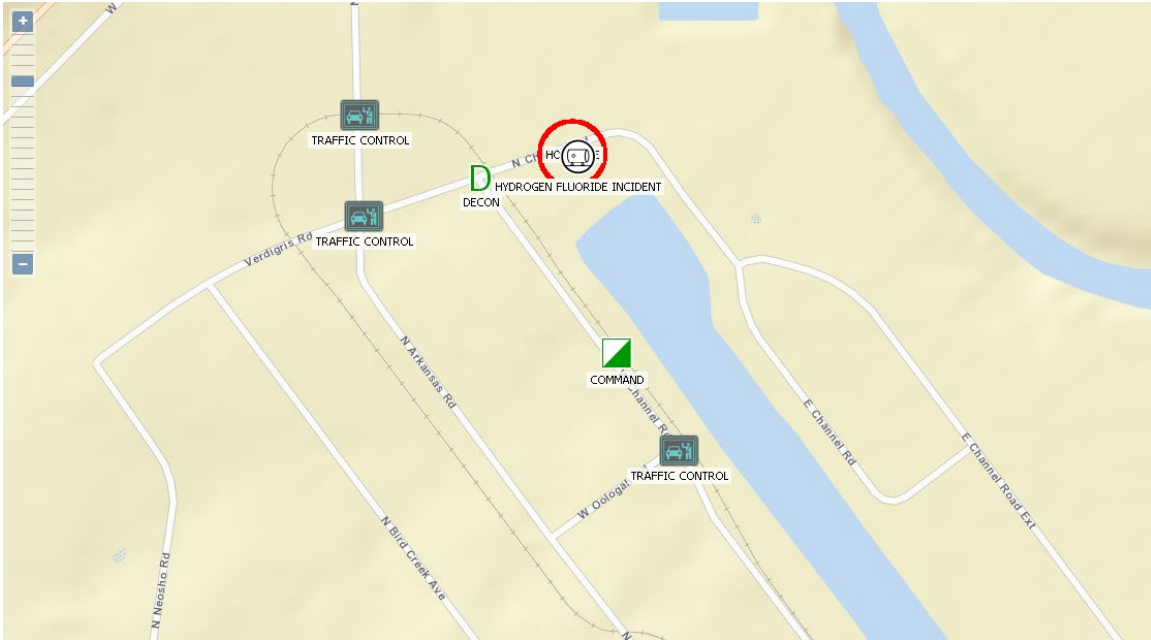
1. Use CAMEO Chemicals to gather information for the various chemicals.
 - a. What is the product?
 - b. What are the major hazards of the product?
 - c. What happens if this product comes in contact with water?
 - d. Based on this information, what would you recommend as the Immediate Isolation Zone distance?
 - e. Based on this information, what would you recommend as the Downwind Evacuation distance?
 - f. Based on the information, what level of protection would you recommend for entry into the Hot Zone?

2. Use the CAMEO Chemicals “Predict Reactivity” module to evaluate the potential reactive hazards for this incident.
 - a. Use the CAMEO Chemicals “Predict Reactivity” module to evaluate the reactive possibilities of this substance with Water, Caustic Soda, and Diesel Fuel.
 - b. What is the “Summary of all possible reactions”?

MARPLOT

1. Launch MARPLOT
2. Select a location in your area to use as the incident site
3. Navigate to the incident location
4. Mark the incident location using the Symbol Tool
5. Use the “Circle” drawing tool to display the Immediate Isolation Zone on the map
6. Use the “Symbol” drawing tool to display the Command Post, Traffic Control, and Decon points.
7. Copy and paste a screenshot of the mapped area from MARPLOT to WORD.





ALOHA

Use ALOHA to model a “worst-case” scenario for both the 50% Hydrofluoric Acid.

SITE DATA:

Location: OKLAHOMA CITY, OKLAHOMA

Building Air Exchanges Per Hour: 2.07 (unsheltered single storied)

Time: January 11, 2021 0917 hours CST (using computer's clock)

CHEMICAL DATA:

Chemical Name: HYDROFLUORIC ACID

Solution Strength: 50% (by weight)

Ambient Boiling Point: 221.3° F

Partial Pressure at Ambient Temperature: 0.030 atm

Ambient Saturation Concentration: 31,231 ppm or 3.12%

Hazardous Component: HYDROGEN FLUORIDE

CAS Number: 7664-39-3

Molecular Weight: 20.01 g/mol

AEGL-1 (60 min): 1 ppm AEGL-2 (60 min): 24 ppm AEGL-3 (60 min): 44 ppm

IDLH: 30 ppm

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 22 miles/hour from SE at 3 meters

Ground Roughness: open country Cloud Cover: 5 tenths

Air Temperature: 88° F Stability Class: D

No Inversion Height Relative Humidity: 50%

SOURCE STRENGTH:

Evaporating Puddle

Puddle Area: 120 square feet Puddle Volume: 2000 gallons

Ground Type: Default soil Ground Temperature: 88° F

Initial Puddle Temperature: Ground temperature

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 0.794 pounds/min
(averaged over a minute or more)

Total Amount Hazardous Component Released: 45.9 pounds

1. Use the ALOHA Source Strength and Text Summary to answer the following questions.
 - a. What is the release rate for this incident? 0.794 pounds/min
 - b. Will all the product be volatilized or evaporated within 1 hour? If not, what is the ALOHA estimate of the time needed for this product to completely volatilize? 2000 GALLONS * 8 LBS/GAL = 16000 LBS; 16000 LBS / 45.9 LBS PER HOUR = 348 HOURS....SO COULD TAKE SEVERAL DAYS TO COMPLETELY VOLATIZE THIS LIQUID
 - c. What is the ALOHA estimate of the amount of product released in the first 60 minutes of the incident? 45.9 POUNDS

From the ALOHA Text Summary (*remember, your numbers will differ from mine due to location and time of day differences*)

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Evaporating Puddle

Puddle Area: 120 square feet Puddle Volume: 2000 gallons

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Total Amount Hazardous Component Released: 45.9 pounds

- a. **6.11 pounds/min**
- b. **No, time estimate is 2000 gallons * 9.6 lbs/gal = 19,200 total lbs of product; 19,200 total lbs / 6.11 lbs per minute = 3142 minutes; 3142 min / 60 min per hour = about 50 hours for the product to completely volatilize**
- c. **323 pounds out of a total of 19,200 pounds**

Use the following Threat Zone data:

Toxic Level of Concern

Select Toxic Level of Concern:

Red Threat Zone

LOC: AEGL-3 (60 min): 44 ppm

Orange Threat Zone

LOC: AEGL-2 (60 min): 24 ppm

Yellow Threat Zone

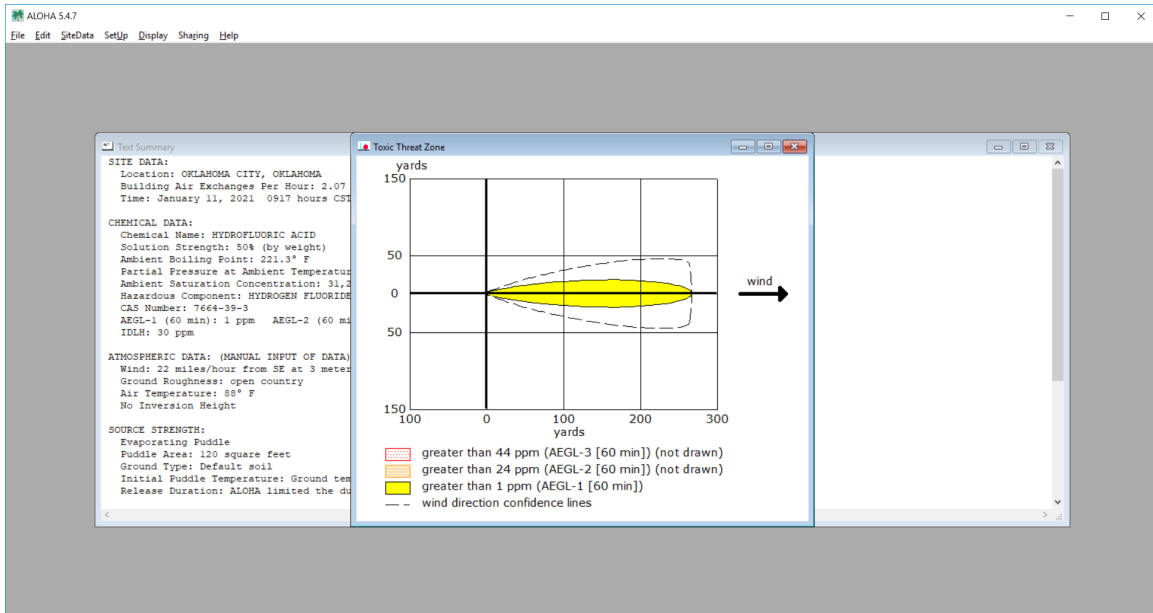
LOC: AEGL-1 (60 min): 1 ppm

Show wind direction confidence lines:

only for longest threat zone

for each threat zone

OK Cancel Help



THREAT ZONE:

Model Run: Gaussian

Red : 35 yards --- (44 ppm = AEGL-3 [60 min])

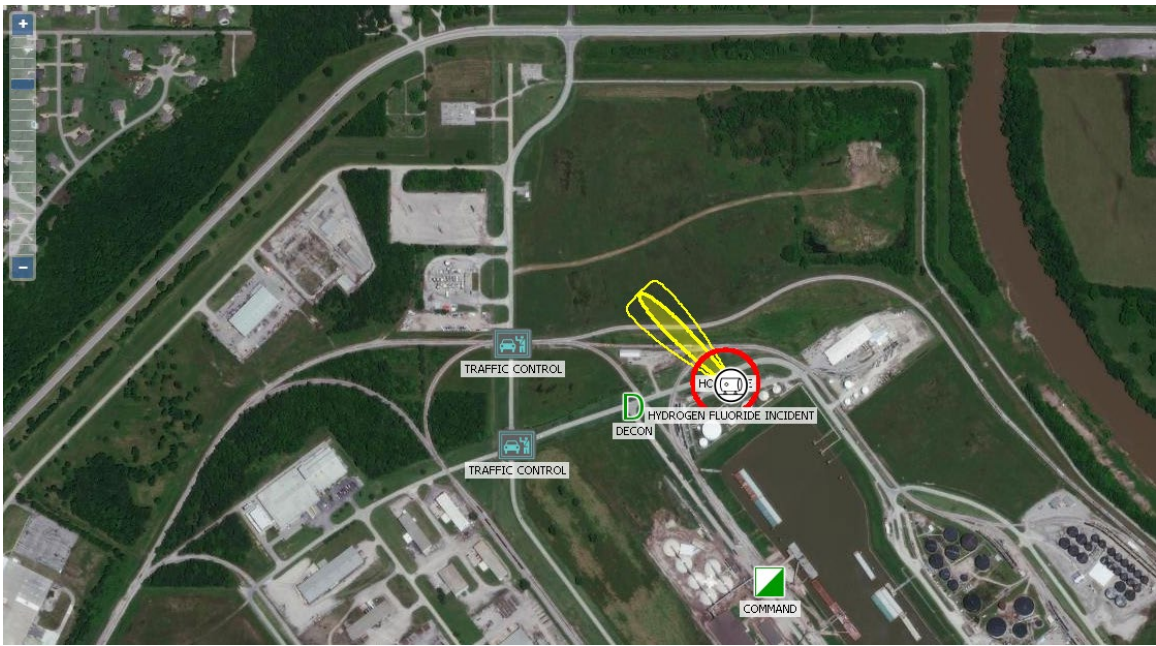
Note: Threat zone was not drawn because effects of near-field patchiness make dispersion predictions less reliable for short distances.

Orange: 49 yards --- (24 ppm = AEGL-2 [60 min])

Note: Threat zone was not drawn because effects of near-field patchiness make dispersion predictions less reliable for short distances.

Yellow: 267 yards --- (1 ppm = AEGL-1 [60 min])

Note: your ALOHA Threat Zone will be different than the one shown above because of time of day and location differences. The Threat Zone shown above is for Shawnee Oklahoma on September 1, 2011 1000 hours CDT.



Note: your ALOHA Threat Zone will be different than the one shown above because of time of day and location differences. The Threat Zone shown above is for Oklahoma City on June 29, 2010 1105 hours CDT.

ANSWERS: CAMEO Chemicals

1. Use CAMEO Chemicals to gather information for the various chemicals.
 - a. What is the product? HYDROGEN FLUORIDE, SOLUTION
 - b. What are the major hazards of the product? HEALTH, HIGHLY TOXIC, REACTIVE
 - c. What happens if this product comes in contact with water? MAY PRODUCE DEADLY VAPORS
 - d. Based on this information, what would you recommend as the Immediate Isolation Zone distance? AT LEAST 150 FEET
 - e. Based on this information, what would you recommend as the Downwind Evacuation distance? POSSIBLY AS MUCH AS 2 MILES
 - f. Based on the information, what level of protection would you recommend for entry into the Hot Zone? LEVEL A

2. Use the CAMEO Chemicals “Predict Reactivity” module to evaluate the potential reactive hazards for this incident.
 - a. Use the CAMEO Chemicals “Predict Reactivity” module to evaluate the reactive possibilities of this with Water, Caustic Soda, and Diesel.

	HYDROGEN FLUORIDE, ANHYDROUS		
SODIUM HYDROXIDE, SOLID	Incompatible ■ Generates heat Potentially hazardous	SODIUM HYDROXIDE, SOLID	
FUEL OIL, [DIESEL]	Compatible ■	Compatible ■	FUEL OIL, [DIESEL]
WATER	Caution ■ Corrosive Generates gas Generates heat Toxic	Caution ■ Corrosive Generates gas Generates heat Toxic	Compatible ■

- b. What is the “Summary of all possible reactions”?

Summary of Hazard Predictions (for all pairs of substances)

Corrosive: Reaction products may be corrosive
Generates gas: Reaction liberates gaseous products and may cause pressurization
Generates heat: Exothermic reaction at ambient temperatures (releases heat)
Toxic: Reaction products may be toxic
Potentially hazardous: May be hazardous but unknown

