CAMEO Refresher Exercise Set:  July, 2010
CAMEO and Reactive Chemicals: Transportation Incident

Scenario:
A 1-ton cargo truck has overturned on a local roadway. Local responders have secured the immediate area, and have obtained the shipping manifest from the vehicle cab. The manifest lists the following materials on-board:

- Hydrochloric Acid
- Nitric Acid
- Caustic Soda
- Potassium Hydroxide
- Acetic Acid (Glacial)

There are four 55-gallon drums and approximately 100 paper sacks strewn about the area. At present, none of the drums appear to be leaking product. The ground is covered with what appears to be a white, powdery substance coming from several of the paper sacks.

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. (CAMEO Companion pages 31-34)
   a. Which listed products are likely contained in the 55-gallon drums?
   b. Which listed products are likely contained in the paper sacks?
   c. Which product(s) are the white powder on the ground?
   d. Which products represent the greatest threat to the first responders?
   e. Based on this information, what would you recommend as the Immediate Isolation Zone distance?
   f. Based on this information, what would you recommend as the Downwind Evacuation distance?
   g. 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. (CAMEO Companion pages 34-35)
   a. Add each of the listed materials to the CAMEO Chemicals “My Chemicals” list
   b. Use the CAMEO Chemicals “Predict Reactivity” module to evaluate the reactive possibilities.
   c. What is the “Summary of all possible reactions”?
1. Launch MARPLOT
2. Select a location in your area to use as the incident site
3. Navigate to the incident location (CAMEO Companion pages 57-62)
4. Mark the incident location using the “Extras / Marked Point / Mark Click Point” menu (CAMEO Companion pages 65-66)
5. Use the “Circle” drawing tool to display the Immediate Isolation Zone on the map (CAMEO Companion pages 74, 81)
6. Use the “Symbol” drawing tool to display the Command Post, Staging Area, Triage, and Decon points. (CAMEO Companion pages 74-80)
7. Use the “Polygon” drawing tool to display the ERG-suggestion downwind evacuation area
8. Copy and paste a screenshot of the mapped area from MARPLOT to WORD. (CAMEO Companion pages 85)
ALOHA

Use ALOHA to model a “worst-case” scenario for both the Hydrochloric Acid and the Nitric Acid. Assume the Hydrochloric is 42% solution, and the Nitric is 70% solution. (CAMEO Companion pages 102-104)

*Note:* only the Puddle source can be used when modeling a chemical “solution”.
## Chemical Information

View:
- Pure Chemicals
- Solutions

<table>
<thead>
<tr>
<th>AQUEOUS AMMONIA</th>
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<tbody>
<tr>
<td>HYDROCHLORIC ACID</td>
</tr>
<tr>
<td>HYDROFLUORIC ACID</td>
</tr>
<tr>
<td>NITRIC ACID</td>
</tr>
<tr>
<td>OLEUM</td>
</tr>
</tbody>
</table>

Solution Strength: 42% [by Weight]

The percentage of hydrogen chloride in solution. Allowable range is 20 to 42 percent.

### Assume the following weather data:

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
- Wind: 12 miles/hour from w at 3 meters
- Ground Roughness: urban or forest
- Cloud Cover: 5 tenths
- Air Temperature: 82°F
- Stability Class: D
- No Inversion Height
- Relative Humidity: 65%
Assume the following Source data:

SOURCE STRENGTH:
Evaporating Puddle
Puddle Area: 400 square feet       Puddle Volume: 55 gallons
Ground Type: Default soil         Ground Temperature: 82° F
Initial Puddle Temperature: 68.9° F
Release Duration: ALOHA limited the duration to 1 hour
Max Average Sustained Release Rate: 35.9 pounds/min
(averaged over a minute or more)
Total Amount Hazardous Component Released: 130 pounds
Assume the following Threat Zone data:

**Red Threat Zone**
- LOC: AEGL-3 (60 min): 100 ppm

**Orange Threat Zone**
- LOC: AEGL-2 (60 min): 22 ppm

**Yellow Threat Zone**
- LOC: AEGL-1 (60 min): 1.8 ppm

**Show confidence lines:**
- ○ only for longest threat zone
- ○ for each threat zone

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.
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.
NITRIC ACID: 70% USING “PUDDLE” SOURCE

Use the same Weather Conditions and Puddle Source model as for the Hydrochloric Acid.

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 12 miles/hour from w at 3 meters
Ground Roughness: urban or forest      Cloud Cover: 5 tenths
Air Temperature: 82° F                 Stability Class: D
No Inversion Height                    Relative Humidity: 65%

SOURCE STRENGTH:
Evaporating Puddle
Puddle Area: 400 square feet           Puddle Volume: 55 gallons
Ground Type: Default soil              Ground Temperature: 82° F
Initial Puddle Temperature: Ground temperature
Release Duration: ALOHA limited the duration to 1 hour
Max Average Sustained Release Rate: 1.09 pounds/min
   (averaged over a minute or more)
Total Amount Hazardous Component Released: 62.8 pounds
NITRIC ACID: 70% THREAT ZONE

THREAT ZONE:
Model Run: Gaussian
Red : less than 10 meters (10.9 yards) --- (78 ppm = ERPG-3)
Note: Threat zone was not drawn because effects of near-field patchiness make dispersion predictions less reliable for short distances.
Orange: 54 yards --- (6 ppm = ERPG-2)
Note: Threat zone was not drawn because effects of near-field patchiness make dispersion predictions less reliable for short distances.
Yellow: 143 yards --- (1 ppm = ERPG-1)
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**

Use CAMEO Chemicals to gather information for the various chemicals. (CAMEO Companion pages 31-34)

a. Which listed products are likely contained in the 55-gallon drums?
   Hydrochloric, Nitric, and Acetic acids

b. Which listed products are likely contained in the paper sacks?
   Caustic Soda, Potassium Hydroxide

c. Which product(s) are the white powder on the ground?
   Caustic Soda, Potassium Hydroxide

d. Which products represent the greatest threat to the first responders?
   Hydrochloric Acid, Nitric Acid

e. Based on this information, what would you recommend as the Immediate Isolation Zone distance?
   The ERG suggests 50 meters or 150 feet for both the Nitric Acid, other than red fuming; and the Hydrochloric Acid, Solution

f. Based on this information, what would you recommend as the Downwind Evacuation distance?
   ERG Guide 157 suggests an 800 meter or ½ mile evacuation area.

g. Based on the information, what level of protection would you recommend for entry into the Hot Zone?
   Since both the Hydrochloric and the Nitric are Inhalation Hazards, Level A is the most appropriate choice. However, since no “acid” appears to be leaking at present, responders could enter the Hot Zone in Level B.
Use the CAMEO Chemicals “Predict Reactivity” module to evaluate the potential reactive hazards for this incident. (CAMEO Companion pages 34-35)

a. Add each of the listed materials to the CAMEO Chemicals “My Chemicals” list.
b. Use the CAMEO Chemicals “Predict Reactivity” module to evaluate the reactive possibilities.
c. What is the “Summary of Hazard Predictions?"

\[ \textbf{Summary of Hazard Predictions (if all substances mixed)} \]

- Reaction proceeds with explosive violence and/or forms explosive products.
- Heat generated from chemical reaction may initiate explosion.
- May become highly flammable or may initiate a fire, especially if other combustible materials are present.
- Spontaneous ignition of reactants or products due to reaction heat.
- Combination liberates gaseous products, including both flammable and toxic gases. May cause pressurization.
- Exothermic reaction. May generate heat and/or cause pressurization.
- Exothermic, generation of toxic and corrosive fumes.
- Reaction may be intense or violent.