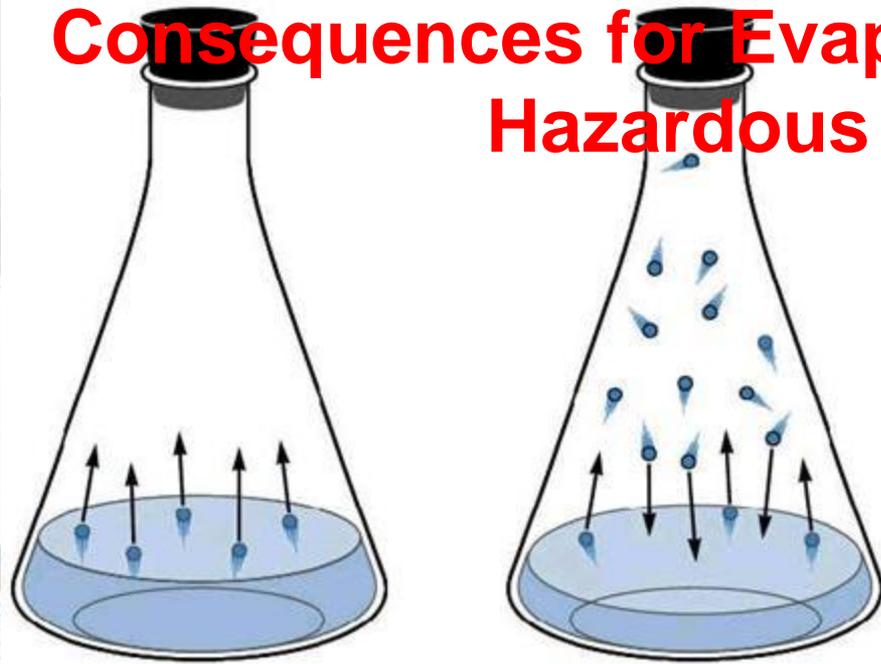
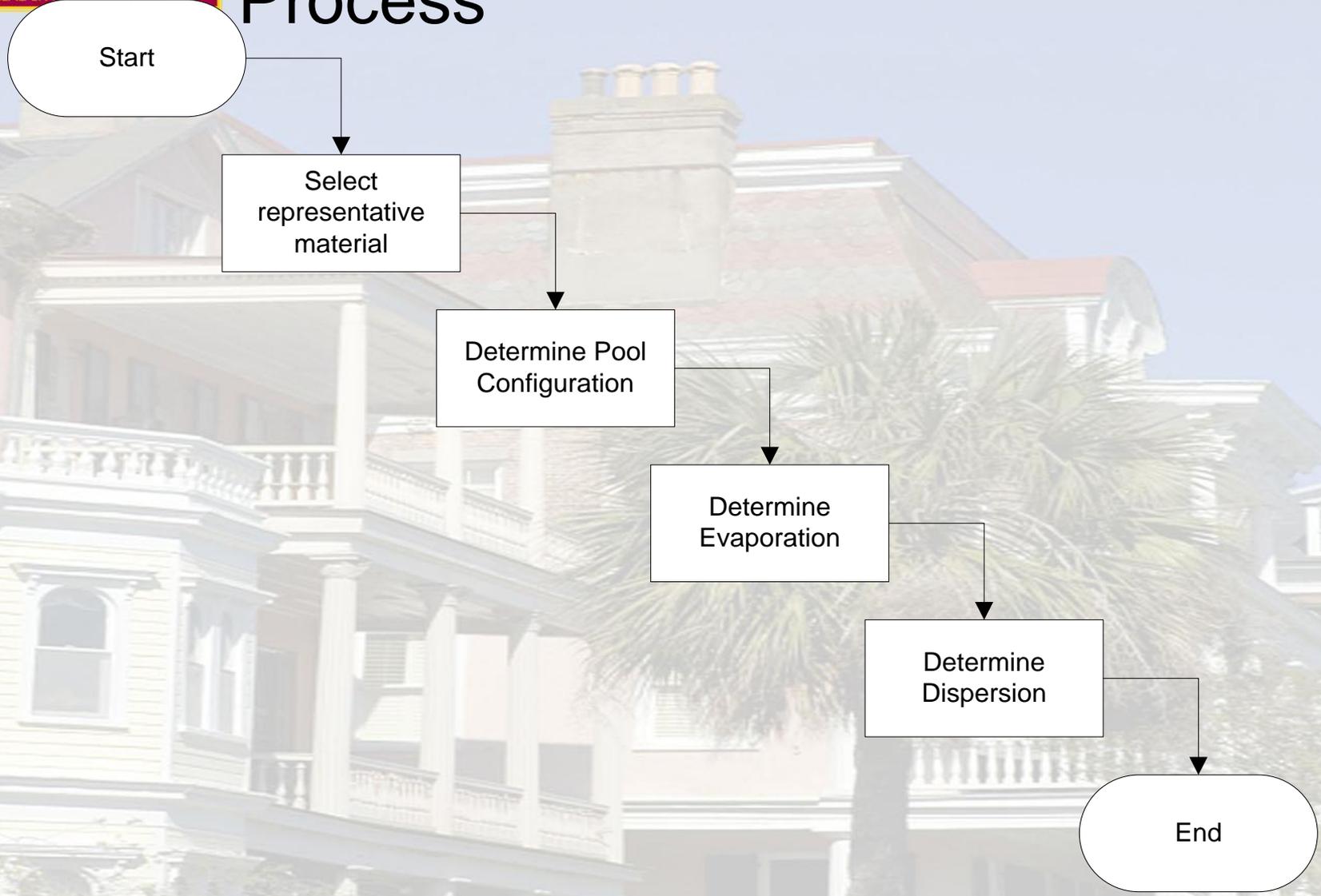


**An Examination of the Relationship between
Vapor Pressure and Downwind
Consequences for Evaporative Releases of
Hazardous Liquids**



Process



Material Selection

- No Real Material
- Queried the SCAPA PAC List
- Filtered for liquids
- Selected the 95th-Percentile worst PAC value
- $0.727\text{mg}/\text{m}^3$
 - Lowest liquid PAC-2 value is Norchlorofluoroepibatidine and Phenyl isocyanate has a PAC-2 value at approximately the 95% value for liquids.

Pool Volume and Configuration

- 1 cm deep circular pool
- The pool volume varies in the calculation
- The density of the material involved remains constant at eight pounds per gallon.

Evaporation

- EPA 550-B-99-009 App. D provides a formula to estimate the evaporation rate from a pool of spilled liquid.

(The constant 7.5599 converts the output from pounds per minute to grams per second.)

$$\dot{m} = \frac{7.5599(0.284u^{0.78} \times MW^{2/3} \times A \times VP)}{(82.05T)}$$

Atmospheric Dispersion

$$C(x, y, z, H) = \frac{Q}{\pi u \sigma_y \sigma_z}$$

- The σ_y and σ_z values were calculated based upon the formulae from EPA-OSWER-88-001 App. G



Notes

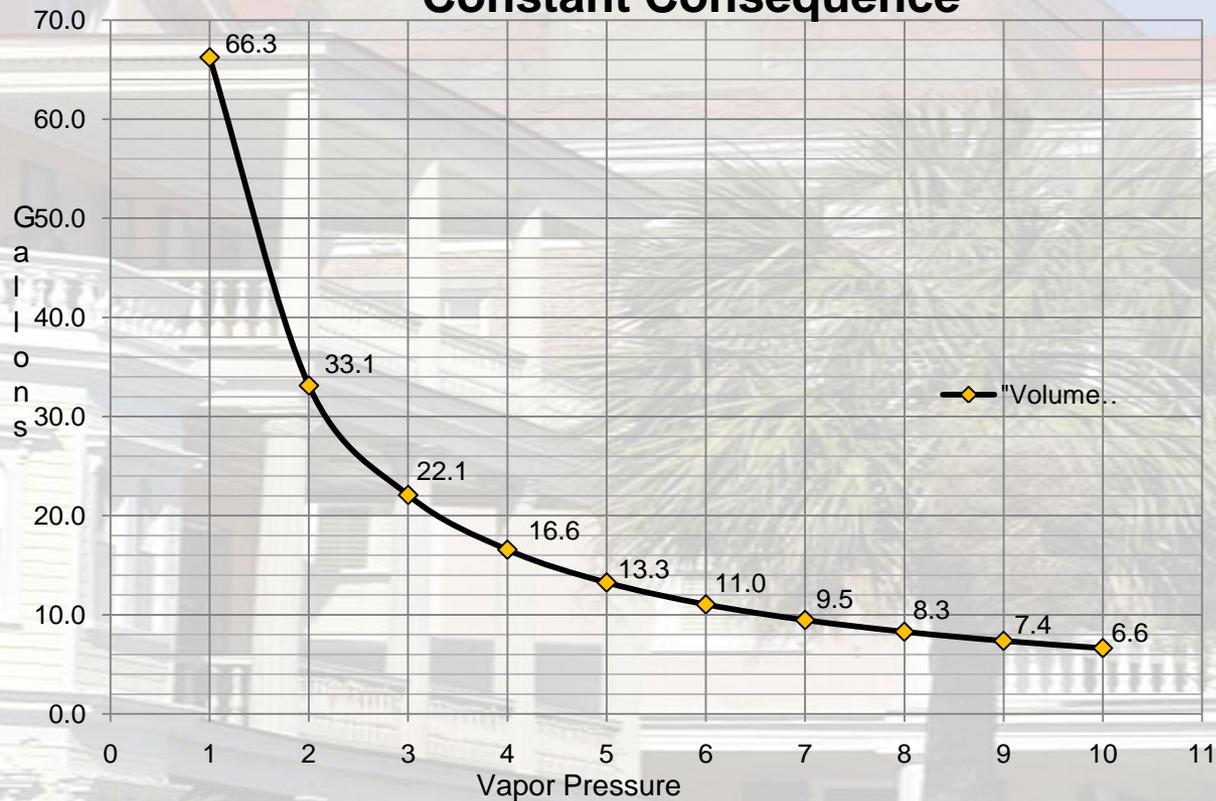
- No virtual release point.
- No plume deposition, depletion or reflection is considered in this analysis.
- No chemical reactions occur in this analysis.
- Material temperature remains constant.
- The receptor is directly downwind of the point of release.

Results

Vapor Pressure	Volume
1	66.3
2	33.1
3	22.1
4	16.6
5	13.3
6	11.0
7	9.5
8	8.3
9	7.4
10	6.6

Graphical Results

Spill Volume Versus Vapor Pressure With Constant Consequence



Comparison to a Real 10mmHg Liquid

- Selected **Lactonitrile**
- NFPA HHR 4
- VP 10mm Hg
- 6.6 gallons
- Ran in ALOHA

Model Run: Gaussian

Red : less than 10 meters(10.9 yards) --- (150 mg/(cu m) = TEEL-3)

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

Orange: less than 10 meters(10.9 yards) --- (18 mg/(cu m) = TEEL-2)

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

Yellow: less than 10 meters(10.9 yards) --- (10 mg/(cu m) = TEEL-1)

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

Comparison to a Real 1mmHg Liquid

- **N,N-DIETHYLANILINE (DEA)**
- VP 1mm Hg
- 66.3 Gallons
- Ran in ALOHA

THREAT ZONE:

Model Run: Gaussian

Red : less than 10 meters(10.9 yards) --- (350 mg/(cu m) = TEEL-3)

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

Orange: 10 meters --- (60 mg/(cu m) = TEEL-2)

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

Yellow: 41 meters --- (10 mg/(cu m) = TEEL-1)

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