

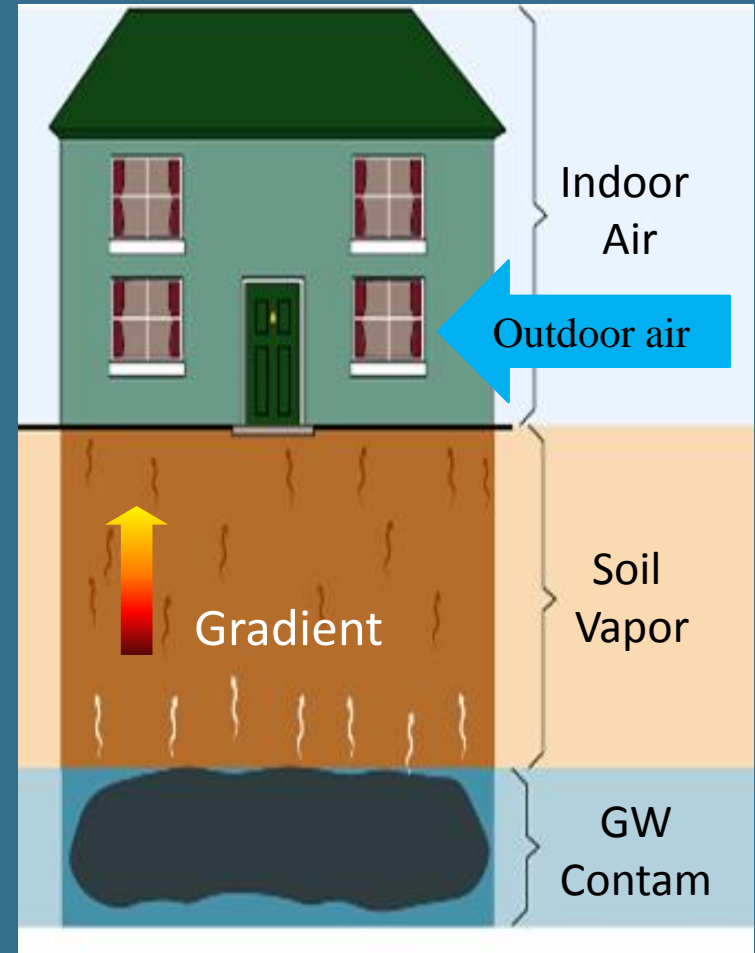
# Volatile Organic Compounds in Phoenix Outdoor Air - JATAP

Phoenix, AZ  
September 2011

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# Soil Gas and Indoor Air

- Vapor intrusion = soil gas entering overlying buildings
- Indoor air levels will be much lower than soil gas levels
  - most indoor air comes from outside (windows, doors)





# Phoenix Outdoor Air Study

## Joint Air Toxics Assessment Project (JATAP)

➤ A partnership of federal, state, local, and tribal air pollution control officials which include:

- US Environmental Protection Agency (EPA)
- Arizona Department of Environmental Quality
- Gila River Indian Community (GRIC)
- Salt River–Pima Maricopa Indian Community (SRPMIC)
- Maricopa County Air Quality Control Department
- Pinal County Air Quality Control District
- Institute for Tribal Environmental Professionals at NAU
- Inter Tribal Council of Arizona, Inc (ITCA)
- Fort McDowell Yavapai Nation



# JATAP

- Measure outdoor air concentrations of volatile organic compounds (VOCs)
- 6 locations throughout Phoenix & 1 rural background location (Queen Valley)
- Samples collected over a 24 hour period every 6 days



# JATAP VOCs

## ➤ Mobile Source Air Toxics

- 1,3-butadiene, acetaldehyde, formaldehyde, benzene, ethylbenzene, toluene

## ➤ Stationary Source Air Toxics

- Chloroform, methylene chloride, trichloroethylene, tetrachloroethylene, styrene, xylenes, hexachlorobutadiene, vinyl chloride

## ➤ Background Air Toxics

- Carbon tetrachloride



# JATAP VOCs

## JATAP Volatile Organic Compounds (VOCs):

- TCE (Trichloroethylene) – M52
- PCE (Perchloroethylene) – M52
  - “Tetrachloroethene” in JATAP
- Chloroform – M52
- Acetaldehyde – high risk
- Benzene – high risk
- Formaldehyde – high risk
- 1,3-Butadiene – high risk

# JATAP Locations



# Annual Average Concentrations

Air Toxic/Monitor	Supersite	Greenwood	S.Phoenix	W.Phoenix	SRPMIC	GRIC	Queen Valley
1,3-butadiene	0.47	0.62	0.64	0.71	0.15	0.13	0.03
Acetaldehyde	3.13	5.07	3.15				
Benzene	2.5	2.79	2.33	2.43	1.65	0.61	0.38
Formaldehyde	5.61	9.81	4.2				
Ethylbenzene	1.61	2.06	1.12	2.38	0.71	0.37	0.82
Dichloromethane	0.83	1.15	0.64	1.04	0.46	0.26	0.12
Tetrachloroethylene	1.43	0.89	1.32	0.94	0.76	0.35	0.18
Trichloroethylene	0.18	0.27	0.22	0.42	0.18	0.18	0.09
Carbon Tetrachloride	0.62	0.63	0.6	0.54	0.57	0.56	0.61
Chloroform	0.59	0.33	0.32	0.34	0.35	0.11	0.05
m,p-Xylene	4.32	5.43	3.46	4.84	1.83	0.88	0.82
o-Xylene	0.78	2.08	1.2	1.67	0.79	0.36	0.38
Styrene	0.76	1.71	0.4	0.82	1.96	0.35	0.11
Toluene	7.18	8.82	6.86	12.87	7.23	2.51	0.59
Vinyl Chloride	0.03	0.03	0.03	0.02	0.02	0.03	0.03
Hexachlorobutadiene	0.12	0.11	2.49	2.91	1.91	2.26	0.11





# Protective Air Concentrations - Residences

## Risk-Based Screening Levels – Inhalation (Inhalation RBSLs)

- TCE:  $1.2 \mu\text{g}/\text{m}^3$
- PCE:  $0.4 \mu\text{g}/\text{m}^3$

(micrograms per cubic meter of air)

## Basis:

- 1 in one-million increased chance of developing cancer
- 24 hours/day, 350 days/year, 30 years exposure

Less frequent and/or shorter exposures = lower risk

# JATAP - TCE

	TCE (ug/m3)	
	Average	Range
Greenwood	0.27	0.05 – 1.7
JLG Supersite	0.18	0.05 – 0.5
St. Johns	0.18	0.07 – 1.0
Salt River	0.18	0.07 – 0.65
South Phoenix	0.22	0.07 – 3.13
West Phoenix	0.42	0.07 – 11.42
*Queen Valley	0.09	0.05 – 0.22
Inhalation RSL: 1.2; Risk Range: 1.2 - 10		
* rural background		

# JATAP - PCE

	PCE (ug/m3)	
	Average	Range
Greenwood	0.89	0.16 – 8.1
JLG Supersite	1.43	0.17 – 5.3
St. Johns	0.35	0.09 – 2.2
Salt River	0.76	0.09 – 17.7
South Phoenix	1.32	0.02 – 33.3
West Phoenix	0.94	0.02 – 13.64
*Queen Valley	0.18	0.07 – 0.52
Inhalation RSL: 0.41; Risk Range: 0.41 – 35		
* rural background		



# VOCs Higher in Phoenix

- VOCs higher in Phoenix compared to typical U.S. urban areas:
  - 1,3-butadiene
  - Acetaldehyde
  - Formaldehyde
  - Chloroform
  - Benzene
  - PCE



# Higher Risk VOCs

➤ Highest risk outdoor VOCs in Phoenix\*  
(greater than 1 in one-million lifetime cancer risk):

- Formaldehyde – 34 in one-million
- Benzene – 8 in one-million
- 1,3-butadiene – 7.5 in one-million
- Chloroform – 3.6 in one-million
- Acetaldehyde – 3.4 in one-million
- PCE – 3 in one-million
- TCE – 0.23 in one-million

\* Greenwood / JLG Supersite / South Phoenix / West Phoenix



QUESTIONS?