

# HEALTH CONSULTATION

## S & L ROOFING COMPANY FIRE PHOENIX, MARICOPA COUNTY, ARIZONA

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Prepared by:

Arizona Department of Health Services  
Office of Environmental Health  
Under Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry

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# HEALTH CONSULTATION

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### BACKGROUND

The Arizona Department of Health Services (ADHS) was requested by the Arizona Department of Environmental Quality (ADEQ) to evaluate the potential health effects that could result from a fire at a local roofing company. ADHS was asked what types of health effects are likely to occur in a nearby residential community, and to also recommend any follow up actions that may be necessary to protect public health.

The roofing company where the fire occurred is located at 4201 W. Harrison Street in a primarily industrial area. The business stored approximately 500 one-gallon containers of various roofing products such as rubberized asphalt, synthetic rubber in solvent solutions, and adhesives for bituthene protection board. At approximately 11:15 pm on June 26, 1998, ADHS responded to a fire at the business. The potential chemicals of concern were identified by ADEQ from the hazardous ingredients list on the Material Safety Data Sheets (MSDS). [Please see [Table 1](#)].

**Table 1: Chemicals on Site (from MSDS)**

Product	Toxic Ingredients	Combustion By-Products
Bituthene or PRMA Liquid Membrane	Napthenic Oil (15%)  Methylene Bisphenyl Isocyanate (4%)	CO, Nitrogen oxides, Sulfur oxides, HCN
Bituthene Mastic	Xylene (15%)  Ethyl Benzene (5%)  Toluene (1%)	Methane, propane, CO, DO <sub>2</sub> , Acrolein, Halogenated compounds, Acids, Ketones, Aldehydes
Waterproofing Membrane	Napthenic Oil (15-35%)	CO, Sulfur oxides, Asphyxiants
Bituthene PBA-3000	Heptane(18%)  Isopropyl Alcohol (1-5%)  Hexane (12%)  Calcium Carbonate (7-10%)	CO, CO <sub>2</sub> , Hydrocarbon, heavy smoke

Upon arriving at the fire scene, the ADEQ Air Quality Emergency Response Team (AQERT) took Draeger tube samples of benzene, toluene, cyanide, and xylene at 19th Avenue and Encanto. These results were non-detect. While the fire was in progress, additional samples continued to be collected every 15 to 30 minutes as far north east as Encanto, towards the closest residential neighborhoods. Until 1:15 pm, all samples were non-detect for benzene, cyanide, toluene, and xylene. [please see [Table 2](#) for air sampling data].

**Table 2: Draeger Tube Air Samples**

Time & Location	Chemical	Detection limit	sample	Comments
1130 hrs 19thAv & Encanto	Xylene Benzene Toluene Cyanide	10-400 ppm 0.5-10ppm 5-80 ppm 2-15 ppm	non-detect (n/d)	Measuring for xylene,benzene, toluene, and Cyanide
1140 hrs 20thAv & Holly			n/d	Measuring for xylene,benzene, toluene, and Cyanide
1155 hrs 19thAv & Granada			n/d	Measuring for xylene,benzene, toluene, and Cyanide
1215 hrs 20thAv & 19thAv			n/d	Measuring for xylene,benzene, toluene, and Cyanide
1230 hrs Veterans memorial & Encanto			n/d	Measuring for xylene,benzene, toluene, and Cyanide
1315 hrs 22ndAv & McDowell			10 ppm	Xylene only
1315 hrs 22ndAv & McDowell	Unknown Compounds		8ppm	Organic vapor meter
1416 hrs				ADEQ generator overheated
1510 hrs				ADEQ left the scene-- sampling ceased

South of the fire, the organic vapor meter detected samples of unidentifiable compounds at 8 ppm. Without additional data, [exposure](#) information cannot be ascertained for the unknown chemicals.

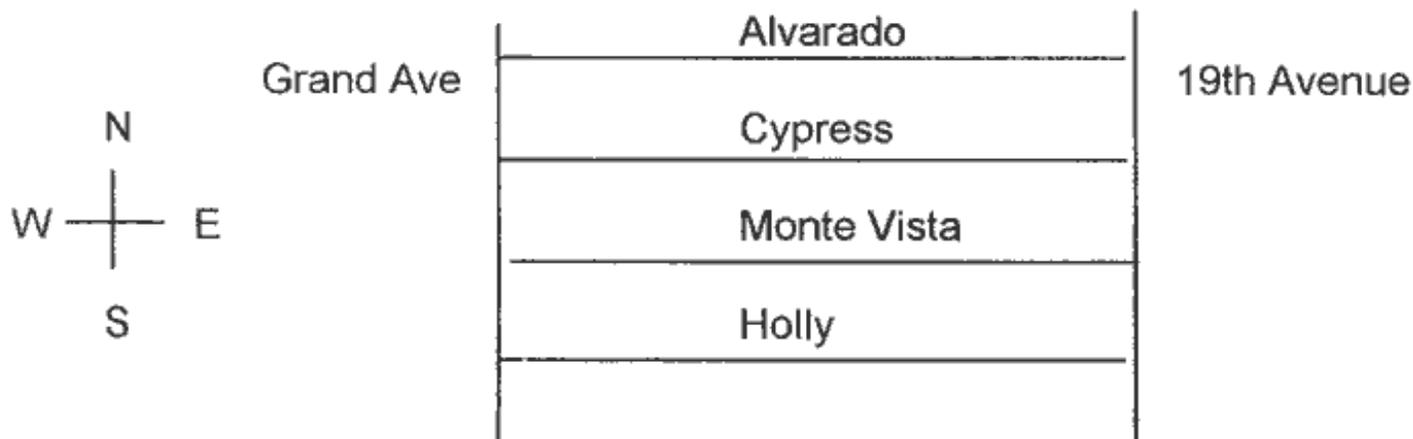
Due to heavy smoke and the levels of xylene, the Phoenix Fire Department evacuated area businesses North to McDowell Road. No [contaminants](#) were detected near the residential area. As a precaution, a health effects survey was later conducted by ADHS in the neighborhood closest to the fire which would have had the greatest likelihood of being exposed. Any health symptoms were characterized and residents self reported any symptoms they experienced.

#### Health Effects Survey

A small residential neighborhood approximately 0.5 mi. northeast of the fire in the direction of the [plume](#) /wind movement was determined most likely to have been impacted by the fire and was surveyed four days after the fire on June 30, 1998. [Figure 1](#) displays the borders of this area. All 140 homes on these four streets were surveyed by a representative from the Office of Environmental Health.

The objectives of the survey was to characterize the symptoms reported by the residents and collect the concerns of the community. Expected symptoms, based upon a toxicological evaluation of the air monitoring data, would later be compared to the reported symptoms. Residents were apprised of the fire, given other health based information, and also given a contact person's name and number at ADHS to report other symptoms or questions.

Figure 1: Area of Residences Surveyed



If residents were home, they received a flyer and were asked whether they were experiencing short-term (lasting ≤ 24 hrs) or long-term (lasting > 24 hrs) health symptoms as a result of the fire.

If residents were not home, a bilingual flyer (please see [attachment A](#)) was left on their door which stated that they should call ADHS if their symptoms persisted. [Table 3](#) summarizes the results of the neighborhood survey.

**Table 3: Residents Reporting Health Symptoms**

Street Name	Present at Home						Not home/ flyer only		Totals	
	No symptoms		Short-term		Long-term		hms	per*	hms	per*
homes	persons	hms	per	hms	per	hms				
<b>Monte Vista</b>	14	45	2	2	0	0	22	70	38	117
<b>Holly</b>	4	13	1	1	3	3	20	64	28	81
<b>Alvarado</b>	15	48	1	1	1	1	12	38	29	88
<b>Cypress</b>	9	29	2	2	0	0	34	109	45	140
<b>Subtotals</b>	42	134	6	6	4	4	<b>88</b>		<b>140</b>	
<b>Total hms</b>	<b>52</b>									
<b>Total persons</b>	<b>144</b>						<b>282</b>		<b>426</b>	

\*3.2 persons/household is extrapolated from 1990 Census data

## DISCUSSION

Samples taken west of the fire on 22nd Avenue showed xylene present in the air at 10 ppm or 43,354 ug/m<sup>3</sup> in the industrial area proximal to the plume (see circle#7 on attached site map). For workers in this area, the level exceeded both the one hour Arizona ambient air quality guidelines for xylene of 5,500 ug/m<sup>3</sup>, and the 24 hour exposure standard of 3500 ug/m<sup>3</sup>. [AQG, 1996].

At a concentration of 10 ppm, the workers are being exposed to more xylene than the acute Minimal Risk Level (MRL) of 1 ppm. The MRL is derived from a Lowest Observed Adverse Effect Level (LOAEL) of 100 ppm that has incorporated an uncertainty factor of 100 (10 for use of LOAEL and 10 for human variability). [ATSDR Tox. Profile, 1995].

There are no reported acute health effects (< 14 days) from inhaling a 10 ppm concentration of xylene. Dudek, et. al, show that humans studies exposed to 100 ppm, for four hours have shown less serious effects such as dizziness and increased reaction time to a given stimulus. Rat studies have shown developmental effects such as reduced ossification when rats are exposed to an acute dose of 53 ppm for 8 days, at a duration of 24 hours a day. [ATSDR Tox. Profile, 1995].

The short-term complaints (<24hrs) coincide with what would be expected from smoke exposure, and included transient coughing, irritation to the eyes, throat, nose, headache, and difficulty breathing.

The long-term complaints (lasting > 24 hrs) from four homes were as follows:

- Home 1:\*\*      Asthma
- Home 2:        Sore throat, headaches
- Home 3:        headache
- Home 4:        breathing problems

\*\* - repeat caller who is already accounted for

There is no pattern/grouping of the location of the homes where people experienced symptoms lasting more than 24 hours. Again, the types of symptoms reported correlate with smoke exposure, and the levels of xylene in the residential area were non-detectible, or less than 10ppm.

During our health effects survey, we made direct contact with 37% of the homes in the target area (52/140). Of the homes surveyed, 4% (6/144) reported that a resident experienced mild symptoms lasting less than 24 hours. The complaints were to be expected from smoke inhalation, and

included cough, irritation of eyes, nose, throat, and headaches.

About 3% (4/144) of the homes reported that a resident had suffered more severe symptoms that lasted longer than 24 hours. The symptoms reported were primarily sore throat, headaches, and asthma attacks/ wheezing. There was no cluster of homes in one particular area which experienced the more long lasting symptoms, and the percentage of people seriously afflicted is relatively low. A small number of people have inherently higher degrees of sensitivity and experience a greater inflammatory response perhaps due to histories of respiratory illness or other genetic factors.

The remaining 63% (88/140) of the homes, that were unresponsive to the door knocking received flyers that instructed residents in both English and Spanish to contact us if they were experiencing any symptoms as a result of the fire. No new cases were called into our office as of July 8, 1998.

## CHILD HEALTH INITIATIVE

There are no reported health effects in the literature from inhaling a 10 ppm dose of xylene in either children or adults. However, children are considered a sensitive subpopulation, along with the immune compromised and elderly, and are more likely to experience health effects at a lower dose than normal adults.

## CONCLUSIONS

Based on the health effects survey and an evaluation of the Arizona Department of Environmental Quality's air sampling data, the Arizona Department of Health Services concludes that the transient symptoms reported were consistent with exposure to the chemicals measured at the roofing fire and from smoke exposure. Although exposure did occur during the fire, no apparent public health hazard currently exists for either adults or children.

ADEQ sampled ambient air for xylene, benzene, cyanide, and toluene. The lack of data on any other toxic ingredient or toxic combustion byproduct is a data gap that can not be evaluated. Furthermore, PM<sub>10</sub> sampling was not conducted and therefore, the effects of the smoke particulates cannot be evaluated.

No health effects data was collected from workers at the company or any neighboring companies in the industrial park, so their symptoms could not be evaluated. This is a data gap in the health effects information collected since these people probably had the highest exposure.

Based on the size and nature of the fire, it is reasonable to conclude that most of the transient health symptoms reported by residents can be attributed to smoke. Current data shows no observed health effects prior to xylene concentrations of 100 ppm, therefore the 10ppm level of xylene is not likely to have posed any public health threat.

## RECOMMENDATIONS

### Actions Taken:

1. ADHS conducted a community health effects survey.
2. ADHS issued a bilingual flyer educating residents about the fire that occurred in their neighborhood and provided a toll free number for them to call and report their symptoms. [[Attachment A](#)]

### Actions Planned:

No further action is recommended at this time.

## REFERENCES

1. ATSDR Toxicological Profile: Xylene, Agency for Toxic Substances and Disease Registry, 1995.
2. ADEQ HAZMAT/ Meteorologist Emergency Report on S&L Roofing Fire Incident, DRAFT, June 1998.
3. Methodology for Developing AZ Ambient Air Quality Guidelines, ADHS-Office of Environmental Health, 1996.

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## **CERTIFICATION**

The S & L Roofing Company Health Consultation was prepared by the Arizona Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

William Greim  
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The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

Richard Gillig  
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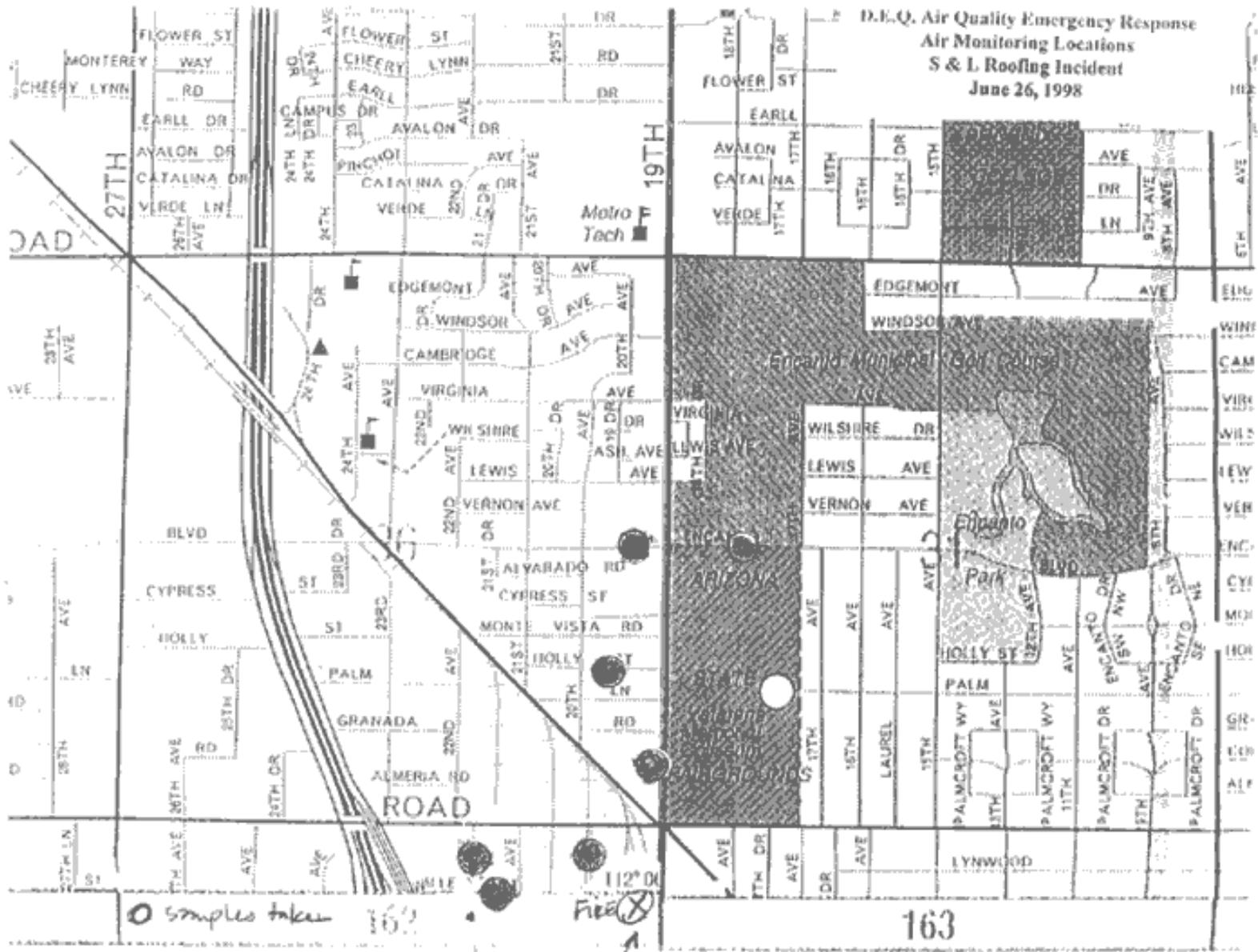


Figure 1. Site Map



Attachment A. Notice of Fire

Figure 1: Site Map



Attachment A



Bureau of Epidemiology & Disease Control Services  
Office of Environmental Health  
(602) 230-5830  
1-800-367-6412  
June 30, 1998

## **FIRE**

A fire occurred at a local building and roofing company on June 26th. The fire burned roofing products and rubber materials.

As with any fire, smoke can cause:

- breathing problems
- burning eyes
  - cough
- sore throat
- headaches

These health problems should be mild and temporary.

If your symptoms are severe, or if your symptoms continue,  
please see your doctor and call us at 230-5830.