

Pollution

- » Categorized into 3 categories
 - » 125-164 ppb is unhealthy for sensitive groups
 - » 165-204 ppb is unhealthy
 - » 205-404 ppb is very unhealthy
- » Houston reaches unhealthy levels throughout the year with peaking between April and October.
- » SE Houston experienced two pollution episodes of very unhealthy in 2000

Houston on a relatively clear day.



Houston on a very smoggy day.



Houston

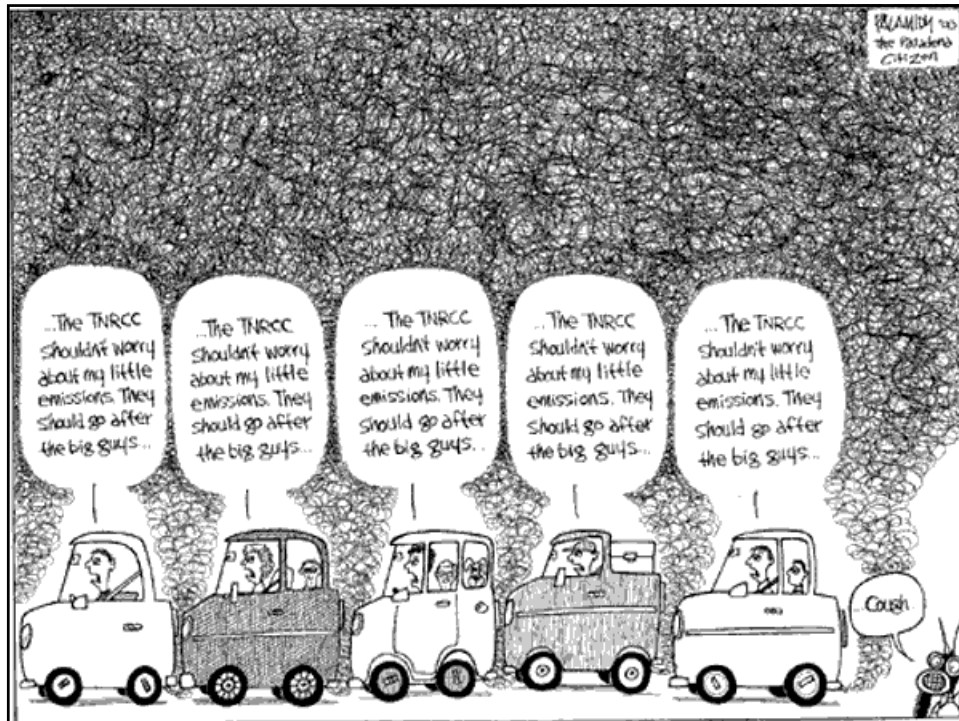
- » S.E. Houston has highest number of days of pollution violations for any county
- » replaced L.A. recently as the city reporting the most days in violation of federal smog standards.
- » faces the loss of \$2 billion in federal highway money if ozone levels are not lowered by this year

- » Researchers at Rice University are attempting to determine the sources of origin of Houston's smog by sending air balloons more than 100,000 feet into the sky
- » Primary contributors of fine particles:
 - » diesel engines contributors
 - » gasoline-powered vehicles
 - » road dust
 - » Smoke particles from wood burning
 - » fatty acids from meat grilling
- » 2/3 of the air pollution in Houston comes from industrial sources and diesel engines according to executive director of the Galveston-Houston Association for smog prevention

Data study in '97-98

- » Data was sampled from four different locations in the Houston-Galveston area
- » Rice measured individual organic compounds that have been linked to specific sources of air pollution
- » Using these measurements they were able to determine the precise proportion of particulate matter produced by each source
- » Little research has been done on airborne particles compared to ozone and CO₂

- » This study found that fuel oil combustion, a common practice at the industrial plants located along the Houston ship channel, produced up to 1.5 micrograms of particulates per cubic meter at one location.
- » These types of particles didn't register at all in the background sample.
- » "This is significant because it's the first time particulates from fuel oil combustion have been found in an apportionment study," said Fraser. "The findings weren't unexpected, given the nature of industrial activity in the city, but they are indicative of an air quality pattern that may be unique to the city."



Smog causes Health Risks

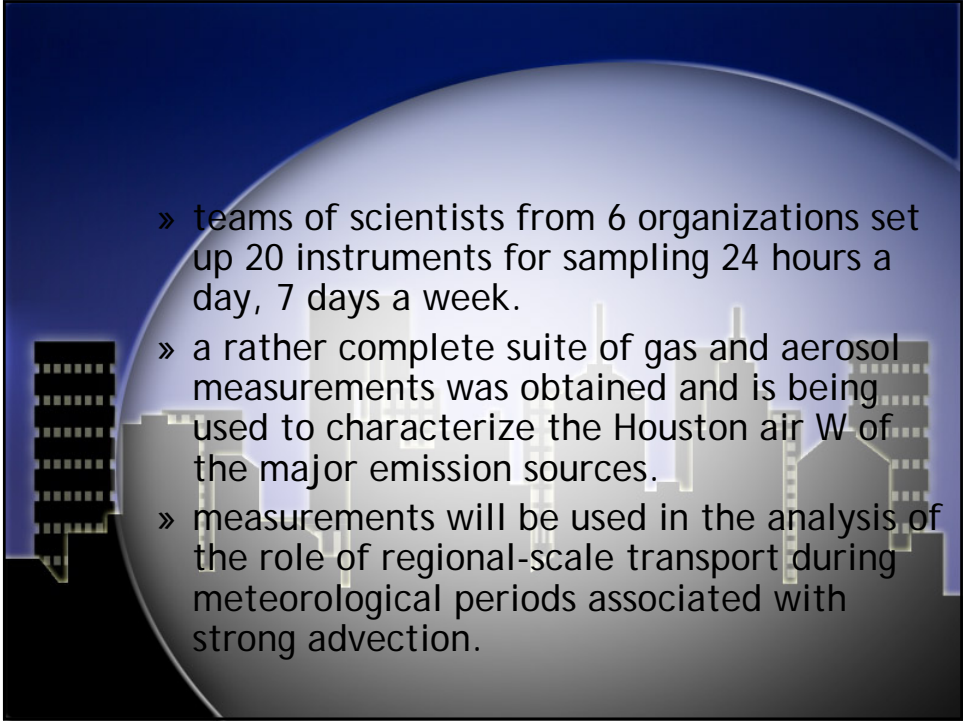
- » One way to measure the health risks of pollutants is to look at potential impact on cancer rates.
- » Clean Air Act states that air pollution should not increase a person's odds of getting cancer by more than one chance in one million.
- » Houston's air falls short of the standard. In the most polluted areas near the Houston Ship Channel, a resident may have 1,000 times more cancer risk than the standard. Even in cleaner areas, pollution elevates potential cancer risk by more than 100 times

Ground-level ozone

- » A principal component of smog
- » Most difficult air pollution problem in the United States.
- » Can cause choking, coughing and stinging eyes.
- » Damages lung tissue, aggravates respiratory disease and makes people more susceptible to respiratory infections.
- » Children, elderly and those with asthma or lung and heart ailments are most vulnerable to harmful effects caused by the ozone in smog.

Texas 2000 Air Quality Study

- » Purpose-improve understanding of problem and develop cost-effective mitigation
- » Month-long data collection campaign, involved more than \$20 million and 300 research scientists.
- » Special meteorological monitoring sites, monitoring from research aircraft, and making measurements from a skyscraper (62nd floor of the Williams Tower in uptown Houston)

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- » teams of scientists from 6 organizations set up 20 instruments for sampling 24 hours a day, 7 days a week.
 - » a rather complete suite of gas and aerosol measurements was obtained and is being used to characterize the Houston air W of the major emission sources.
 - » measurements will be used in the analysis of the role of regional-scale transport during meteorological periods associated with strong advection.