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Air Quality 101

AIR ALLIANCE HOUSTON

- AAH researches greatest air pollution challenges to understand how to improve public health and quality of life.
- AAH offers educational programs to Houston-area youth about air pollution in our region.
- AAH advocates for Houston's communities, meet with legislators, partner with regulators, and organize meetings between industry and communities to promote the protection of health.

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OUR RIGHT TO CLEAN AIR

YOUR HUMAN RIGHT TO CLEAN AIR

International Law and human rights charters have established that every person is entitled to clean air, clean water, and a healthy environment

Unfortunately, this has not stopped governments and corporations from creating toxic pollution zones where the rights of neighbors are infringed upon. Often times, the need for jobs, modernization, and “progress” is cited as justifications for such actions.

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UNITED STATES LAW

- Air Pollution Control Act 1955
- Clean Air Act, by the EPA (Environmental Protection Agency)
- Congress passed the National Environmental Policy Act in 1969 recognizing that *“every person should enjoy a healthy environment”*

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CLEAN AIR ACT 1970

- Congress designed the Clean Air Act to combat a variety of air pollution problems

- Clean Air Act requires EPA to establish National Ambient Air Quality Standards (NAAQS) for certain common and widespread pollutants.

- The EPA has set NAAQS for six common pollutants: particulate matter (PM), Ozone, Sulfur Dioxide, Nitrogen Dioxide, Carbon monoxide, and Lead.

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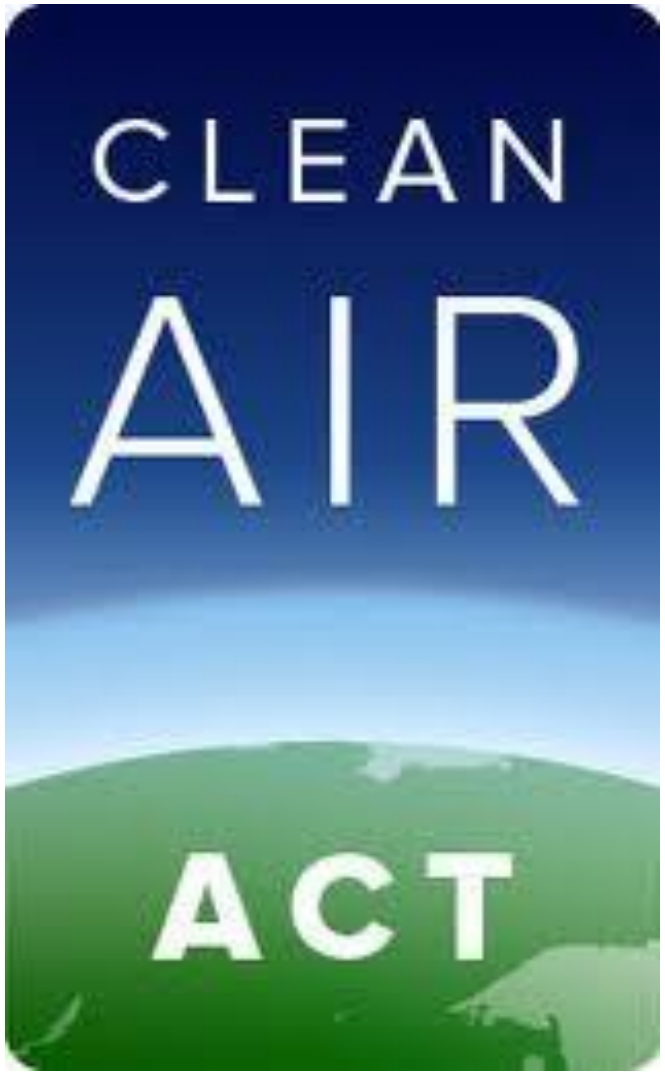
CLEAN AIR ACT PROGRAMS

1. Air Quality and Emissions Limitations
2. Ozone Protection
3. Prevention of Air Quality Deterioration
4. Plan requirement for non-attainment areas



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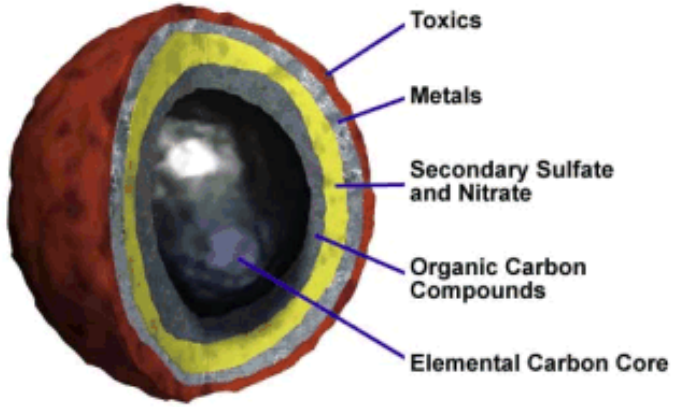
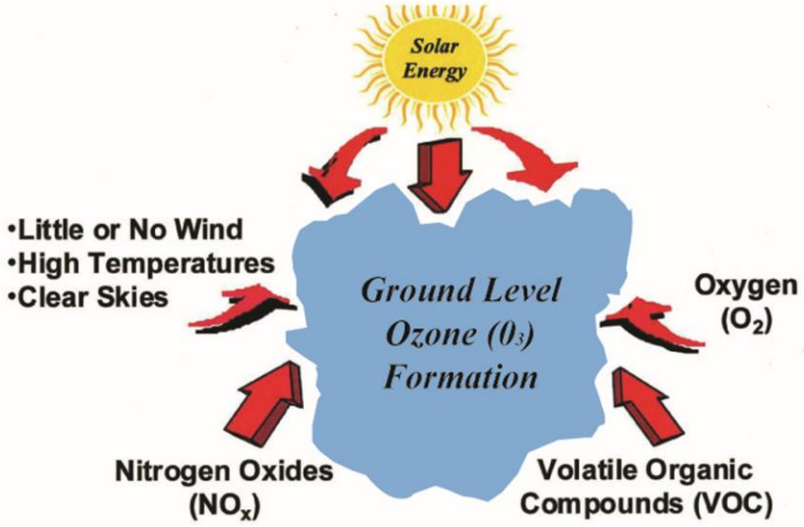
AIR POLLUTANTS

Air Quality 101

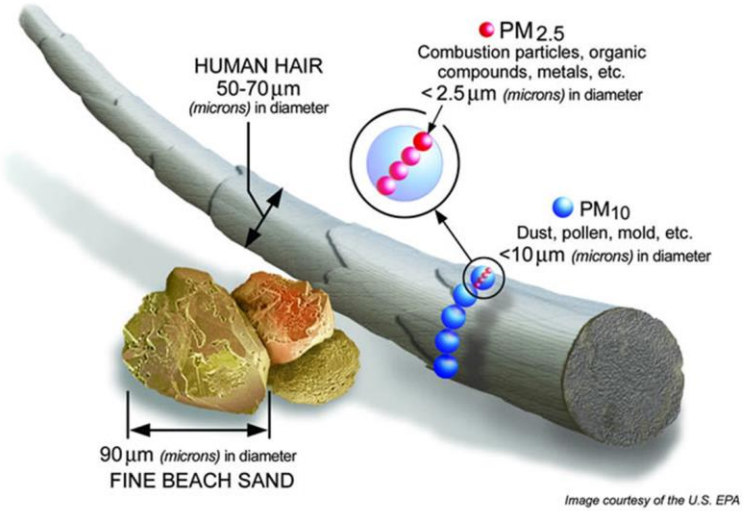
Air Toxics



Ground Level Ozone



Particulate Matter



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AIR POLLUTANTS	FORMATION	EXPOSURE	HEALTH EFFECTS
PARTICULATE MATER	Superfine dust and tiny droplets of things such as the smoke emitted from diesel engines.	PM is very small and they travel deep into the lungs and eventually into the blood.	Respiratory infections, asthma, pre-natal complications.
GROUND LEVEL OZONE	Formed by the chemical reaction of UV radiation with emissions from industry, diesel, and other sources.	Heavily influenced by complex weather patterns and industrial emission events.	Impaired lung development, asthma and respiratory infections, may harm newborns.
AIR TOXICS	Different chemicals mostly found within manufactories.	Contact with acid gases such as Benzene which is found in gasoline.	Risk of cancer, damage to immune system, neurological problems, and respiratory problems.

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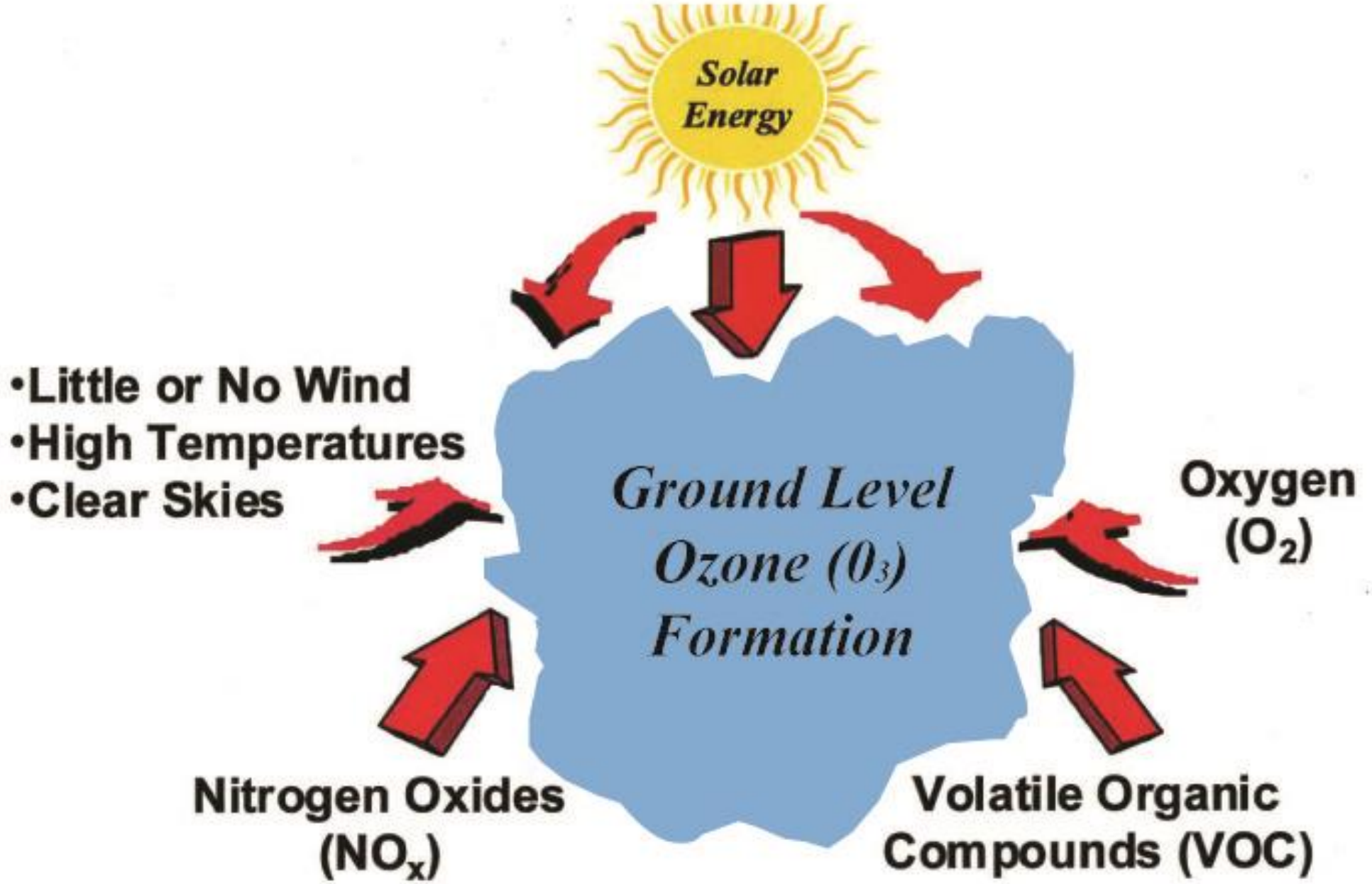
OZONE

Air Quality 101



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NONE OZONE DAY VS HIGH OZONE ACTION DAY

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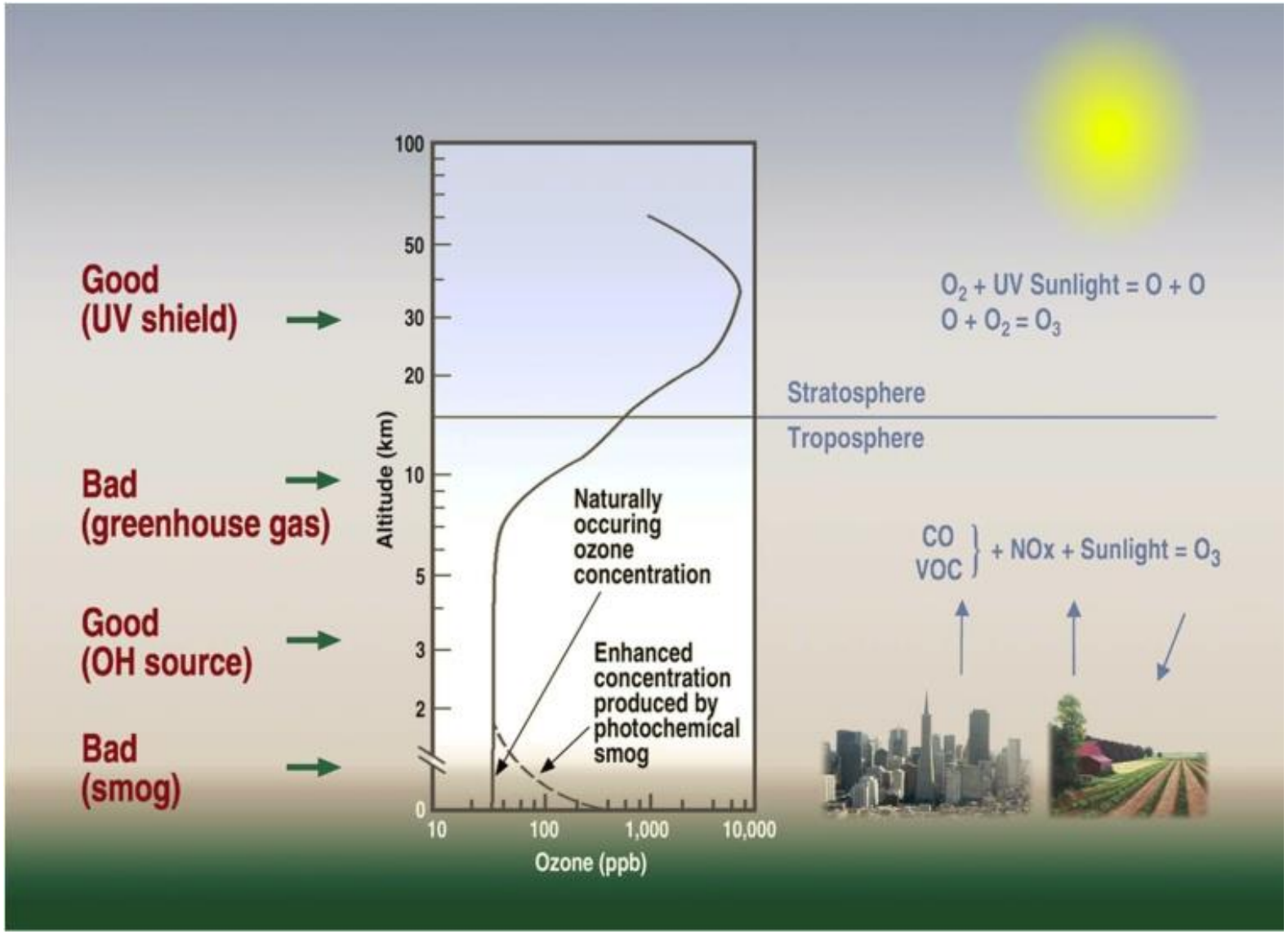
OZONE FORMATION ATMOSPHERICALLY



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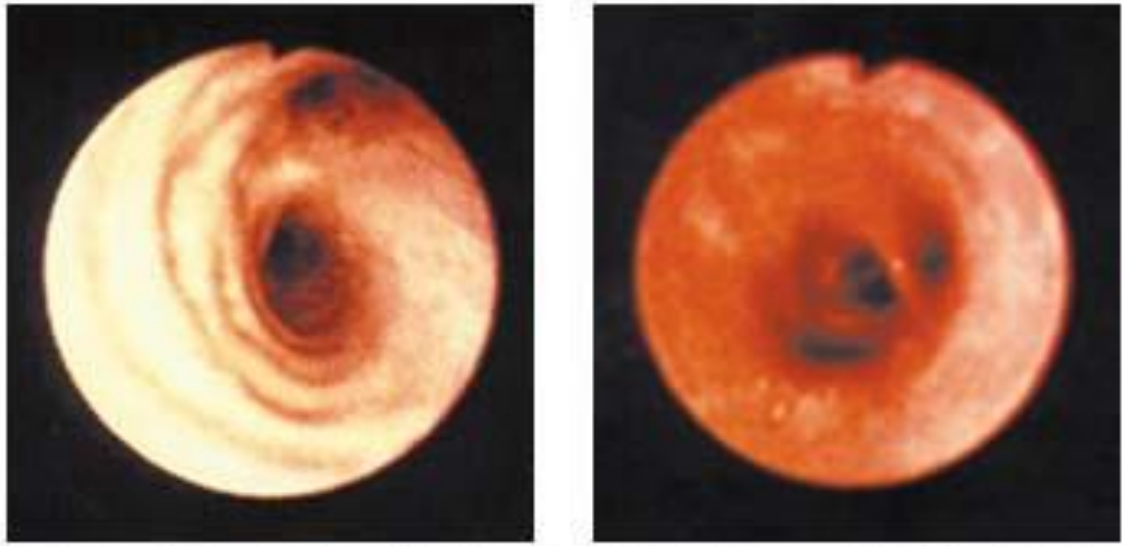
EFFECTS OF OZONE ON RESPIRATORY HEALTH

- Shortness of breath
- Respiratory infections
- Wheezing
- Asthma attacks
- coughing
- Pulmonary inflammation



Ozone can inflame the lung's lining. These photos show a healthy lung air way (left)
and an inflamed lung air way (right).

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CHILDREN AND LONG-TERM OZONE EXPOSURE

- Affects lung development
- Asthma
- May harm newborns
  - Reduce lung function
  - Low birth weight

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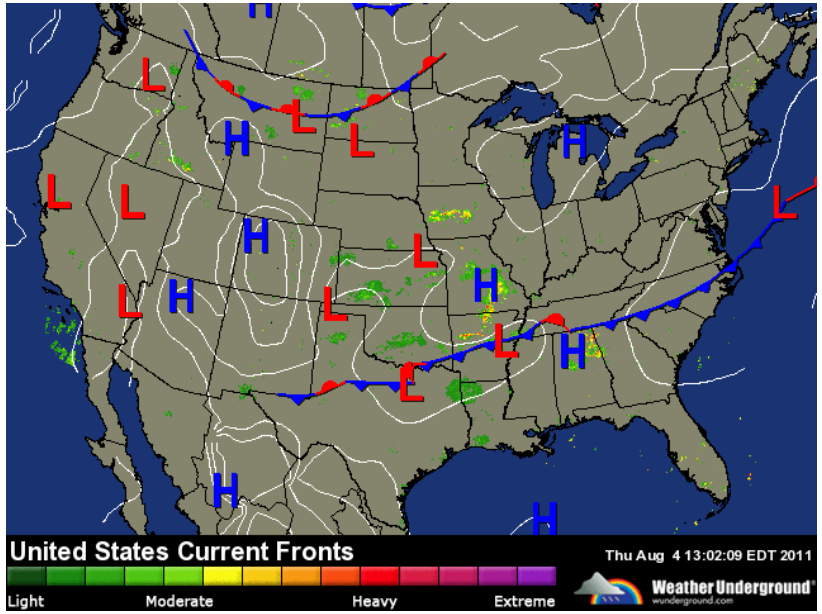
Ozone pollution affects everyone in our region and is heavily influenced by complex weather patterns and industrial emission events.



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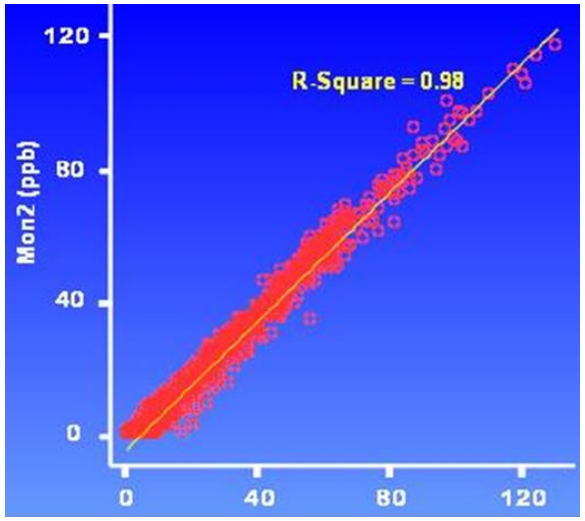
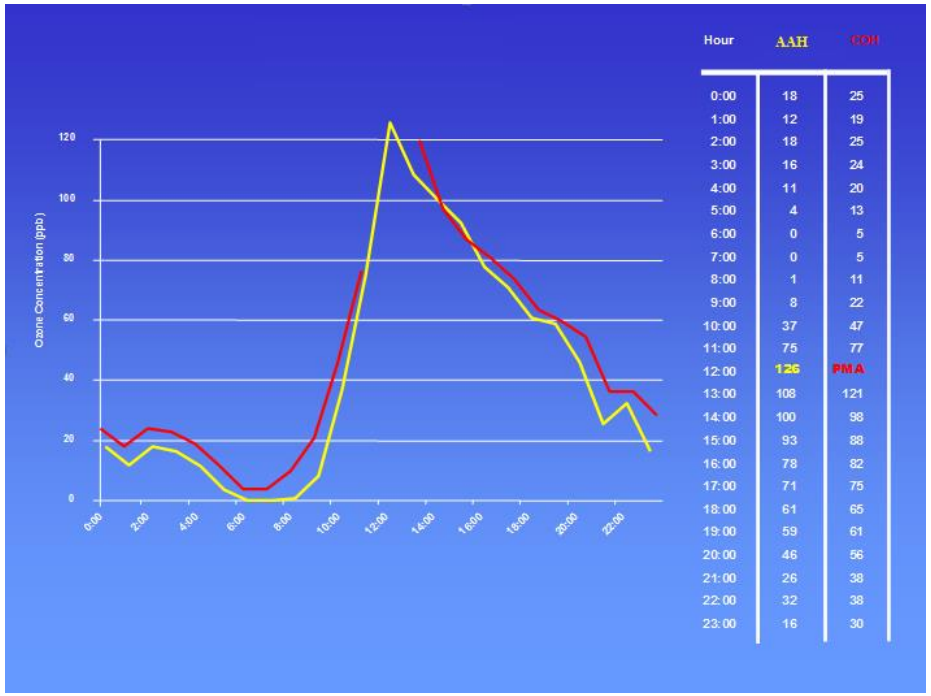
Ozone Monitoring Network





Hour	AAH	COH
0:00	18	25
1:00	12	19
2:00	18	25
3:00	16	24
4:00	11	20
5:00	4	13
6:00	0	5
7:00	0	5
8:00	1	11
9:00	8	22
10:00	37	47
11:00	75	77
12:00	126	PMA
13:00	108	121
14:00	100	98
15:00	93	88
16:00	78	82
17:00	71	75
18:00	61	65
19:00	59	61
20:00	46	56
21:00	26	38
22:00	32	38
23:00	16	30

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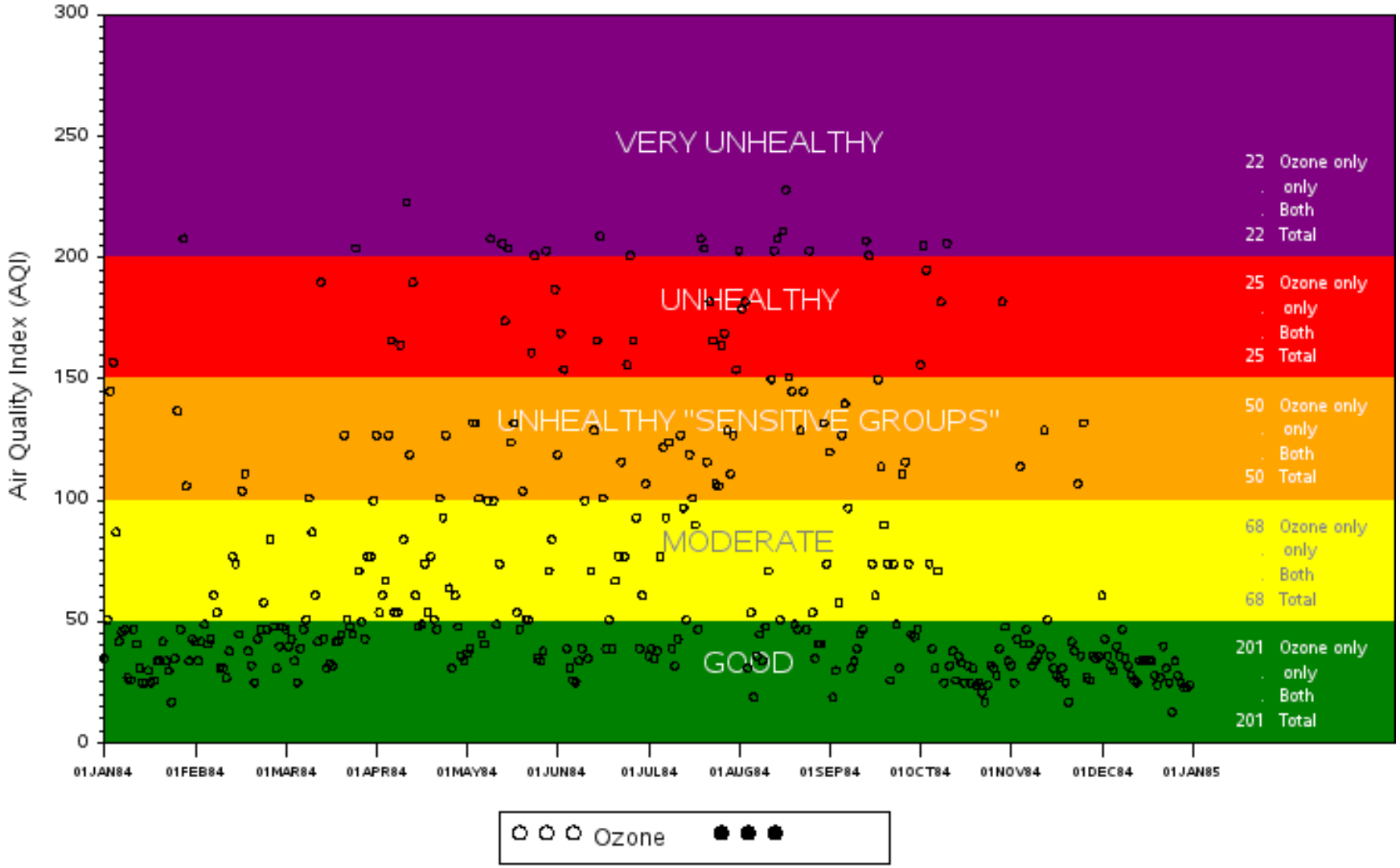
Daily Ozone and AQI Values in 1984

Houston-Sugar Land-Baytown, TX



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: February 9, 2015

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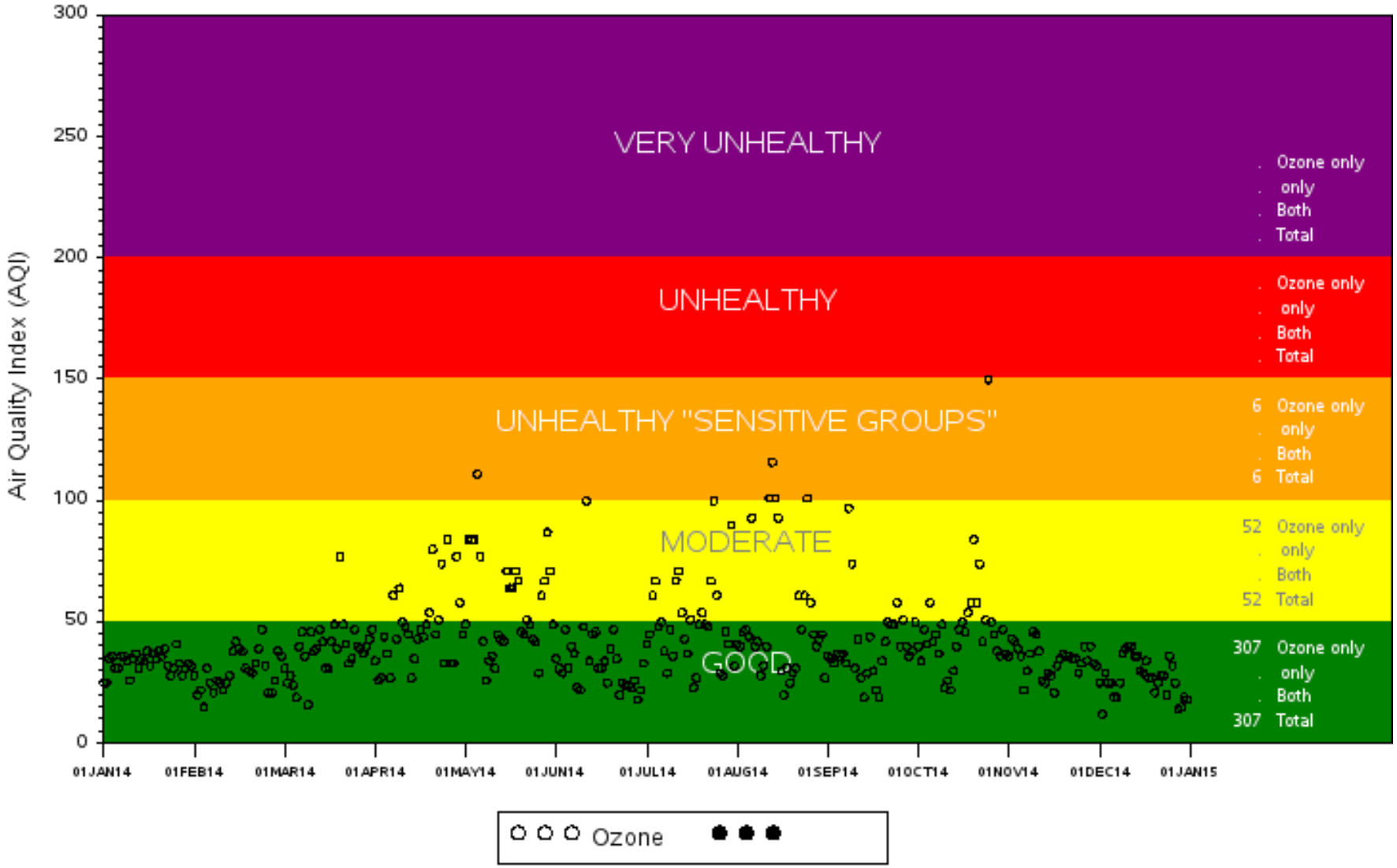
Daily Ozone and AQI Values in 2014

Houston-Sugar Land-Baytown, TX



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: February 9, 2015

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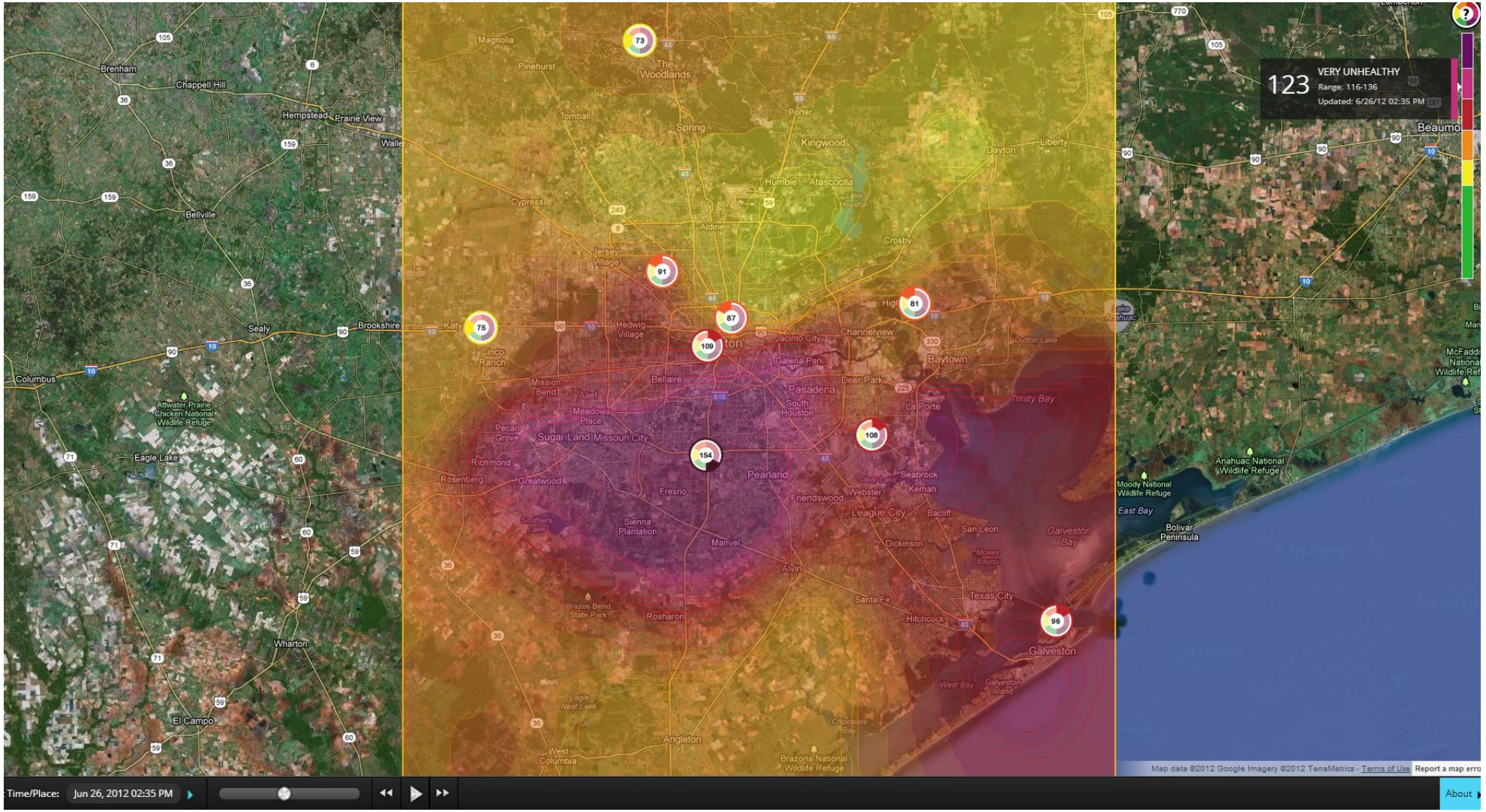
HOUSTON CLEAN AIR NETWORK . COM



http://houstoncleanairnetwork.com/

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Air Toxics

Air Quality 101

AIR TOXICS

- Sources: factories, refineries, plants, cars, cleaning solvents
- Exposure:
  - Breathing contaminated air
  - Eating contaminated food
  - Drinking contaminated water
  - Touching contaminated soil, dust, water

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COMMON AIR TOXICS

- Acid gases
- Asbestos
- Benzene
- Formaldehyde
- Metals
  - Mercury
  - Lead
  - Arsenic

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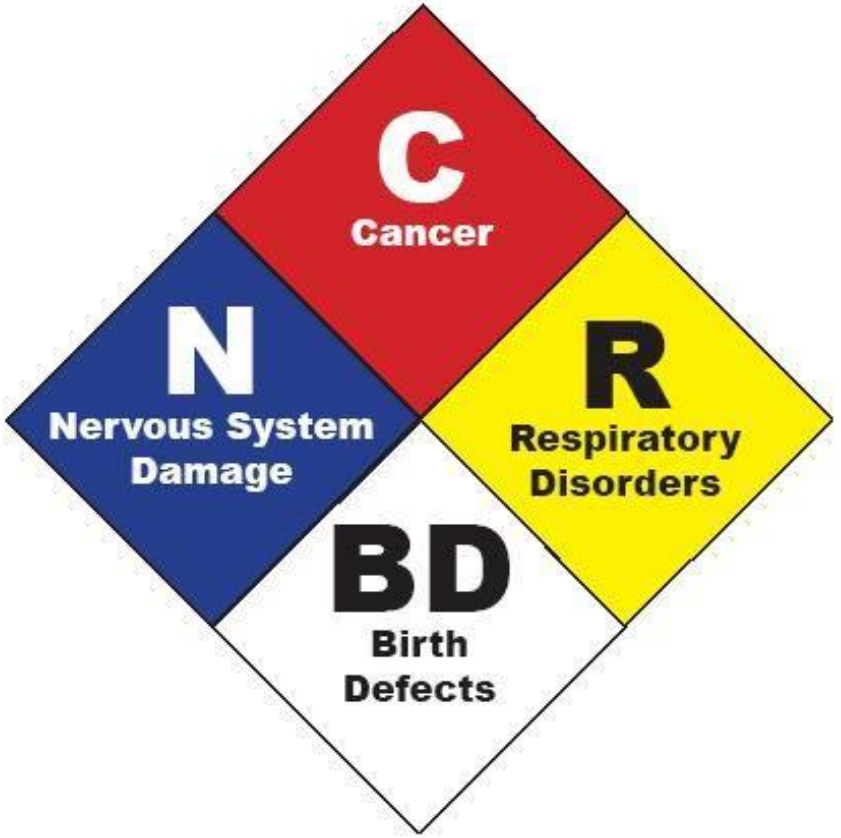
HEALTH EFFECTS OF AIR TOXICS

- Increased risk of cancer
- Damage to immune system
- Neurological problems
- Respiratory problems



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BENZENE AND CHILDREN

- High levels linked to childhood leukemia in SE Texas
- Association found between benzene and Spina bifida in Texas

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Particulate Matter

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Fine Particles: A Threat on the Rise

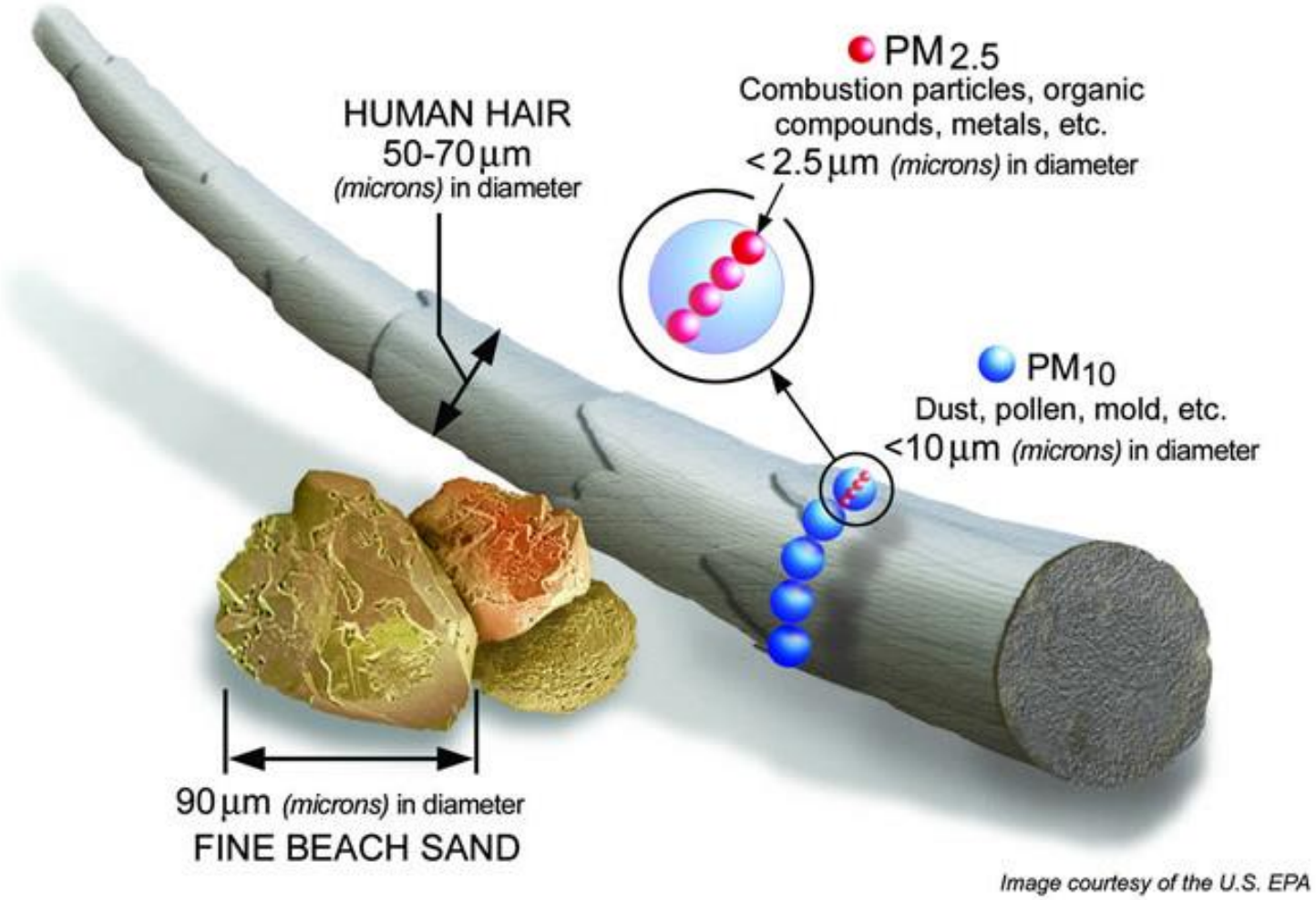

Image courtesy of the U.S. EPA

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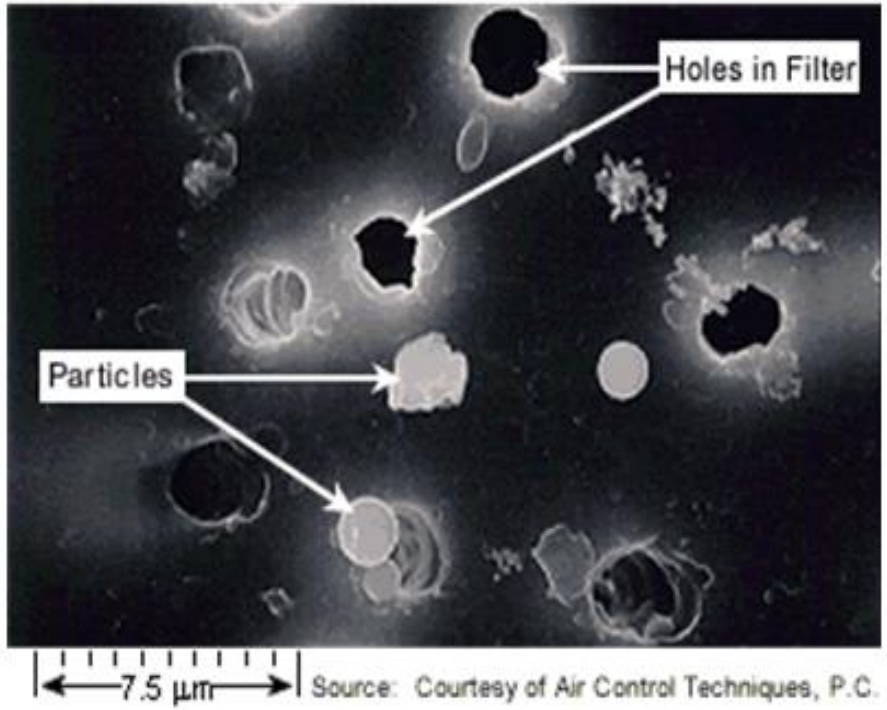
Actual shapes of PM

Figure 1. Example Particle Shapes

	Solid Sphere
	Hollow Sphere
	Solid Irregular
	Flake
	Fiber
	Condensation Floc
	Aggregate

Figure 2. Photomicrograph of Particles on a Polycarbonate Filter



Source: Courtesy of Air Control Techniques, P.C.

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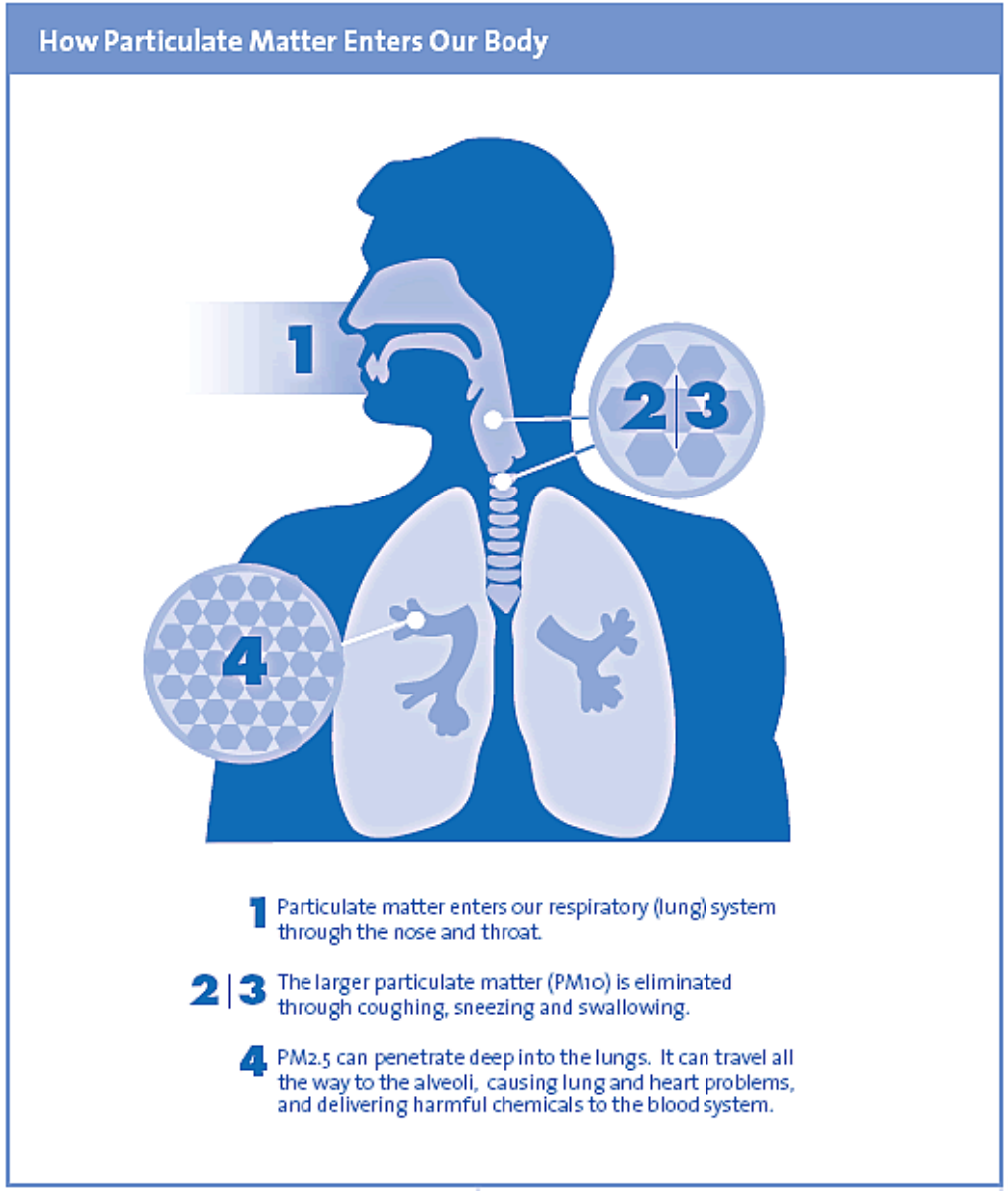
PM: Respiratory Health Effects

- Coughing
- Difficulty breathing
- Reduced lung functioning
- Asthma aggravation



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PM: Cardiovascular Health Effects

- Increase risk of heart attack and other cardiovascular diseases
- Contributes to cardiovascular morbidity

PM: Increased Risk of Cancer

- Long term exposure to PM is associated with increase in lung cancer mortality even among non-smokers.

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VOLATILE ORGANIC COMPOUNDS

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VOLATILE ORGANIC COMPOUNDS

Organic compounds: are chemicals that contain carbon and are found in all living things.

Volatile organic compounds,: sometimes referred to as VOCs, are **organic compounds** that easily become vapors or gases. They always contain carbon and in other occasions they contain elements such as hydrogen, oxygen, fluorine, chlorine, bromine, sulfur or nitrogen

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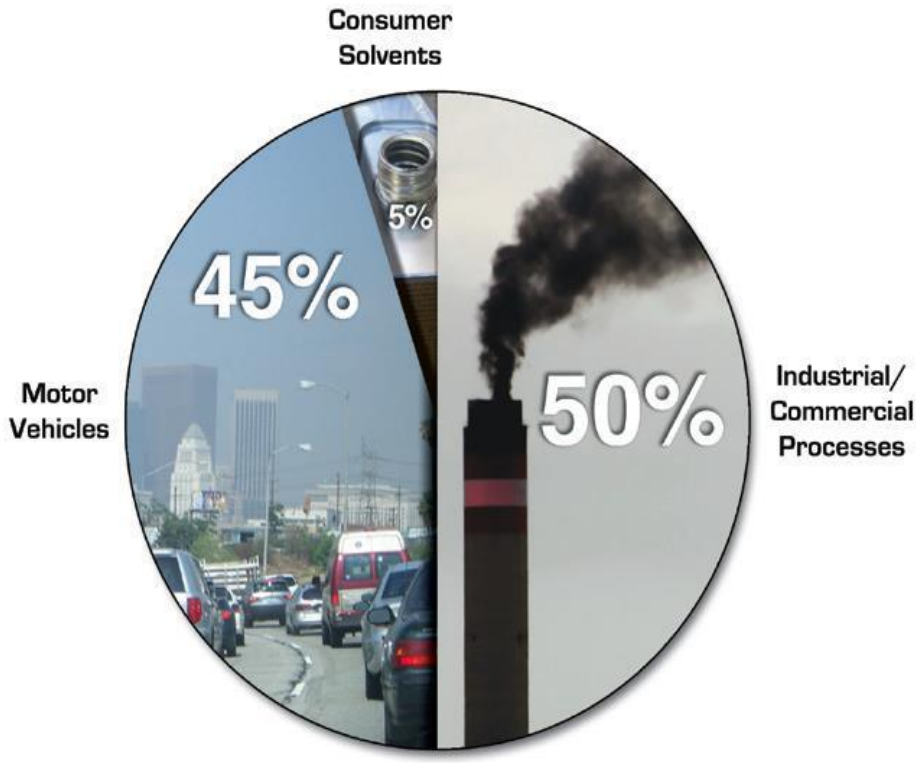
VOC'S SOURCES -EMISSIONS



Sources of Anthropogenic VOC

Released from burning fuel, such as gasoline, wood, coal, or natural gas and they are emitted from oil and gas fields and diesel exhaust. They are also released from solvents, paints, glues, and other products that are used and stored at home and at work.

Volatile organic compounds, when combined with nitrogen oxides, react to form ground-level ozone.

Examples of volatile organic compounds are gasoline, benzene, formaldehyde , solvents such as toluene and xylene the main solvent used in dry cleaning.

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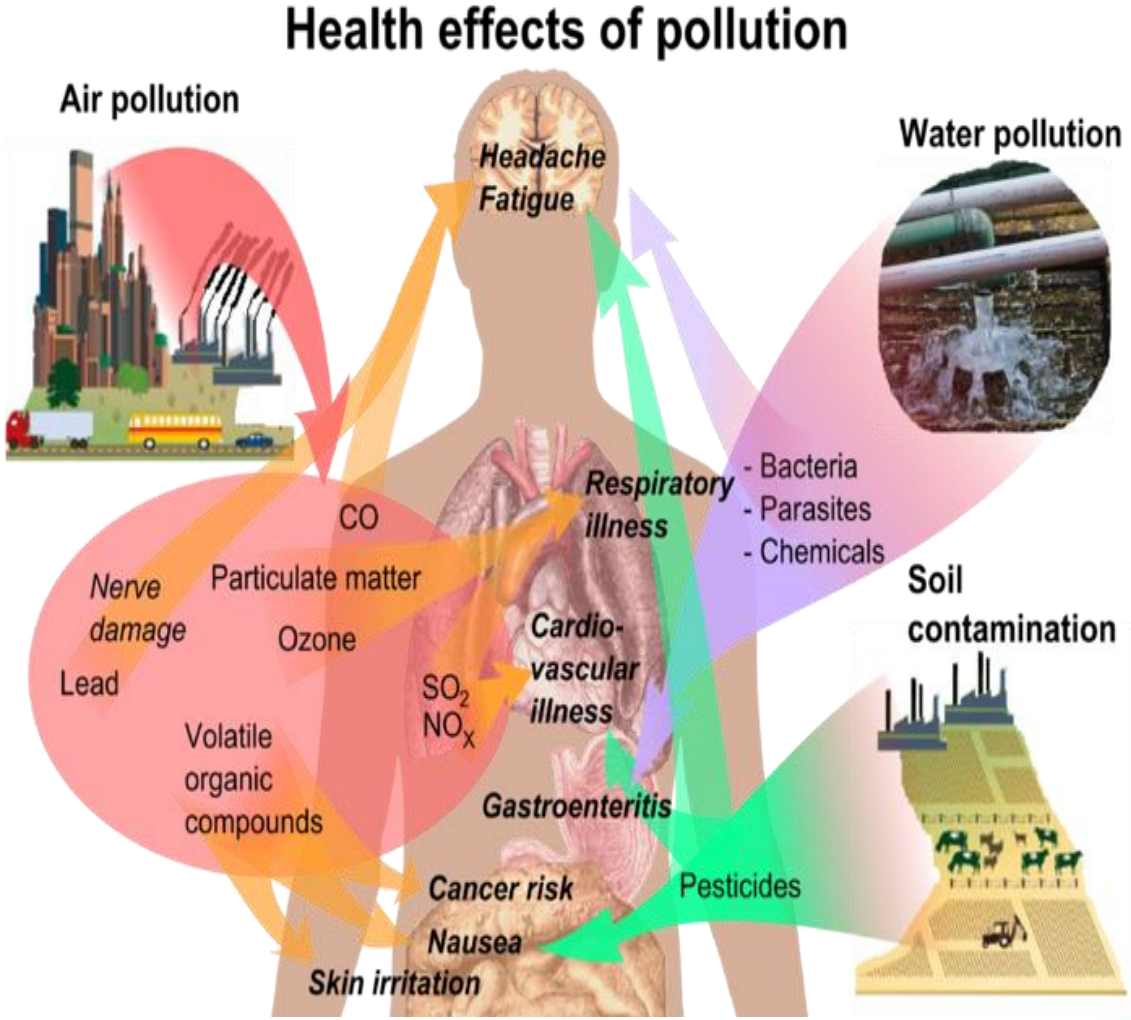
VOC'S EFFECT ON HEALH

Long-term exposure to volatile organic compounds can cause damage to the liver, kidneys, and central nervous system. Short-term exposure to volatile organic compounds can cause eye and respiratory tract irritation, headaches, dizziness, visual disorders, fatigue, loss of coordination, allergic skin reactions, nausea, and memory impairment.



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PROJECTS AND STUDIES

Galena Park Monitoring Project

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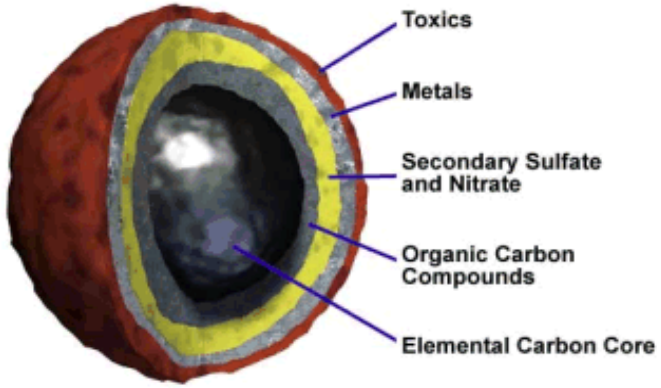
Fine PM in Galena Park



- 1 of 31 samples violated the EPA 24-hour standard.
- Average of all samples was 15.4 µg/m^3, above the EPA annual standard of 12 µg/m^3.

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gcm Global Community Monitor
empowering communities

Diesel Particulate Matter

Elemental Carbon (EC) is used as an indicator of diesel particulate matter pollution.

- EC levels above 0.838 µg/m^3 for 24 hours can be associated with an excess risk of cardiovascular and respiratory hospitalizations on the day of exposure.
- EC levels above 1.36 µg/m^3 for 24 hours can be associated with an excess risk of cardiovascular mortality two to three days after exposure.

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Pasadena Community Project

PROJECT GOALS

- Raise community awareness about air pollution and build strong community advocates in North Pasadena.
- Educate Pasadena decision-makers about air pollution and potential health impacts on residents.
- Build partnerships with community organizations with common interests in the community of North Pasadena to strengthen the voice of the residents.
- Advocate for an anti-idling ordinance in the City of Pasadena.

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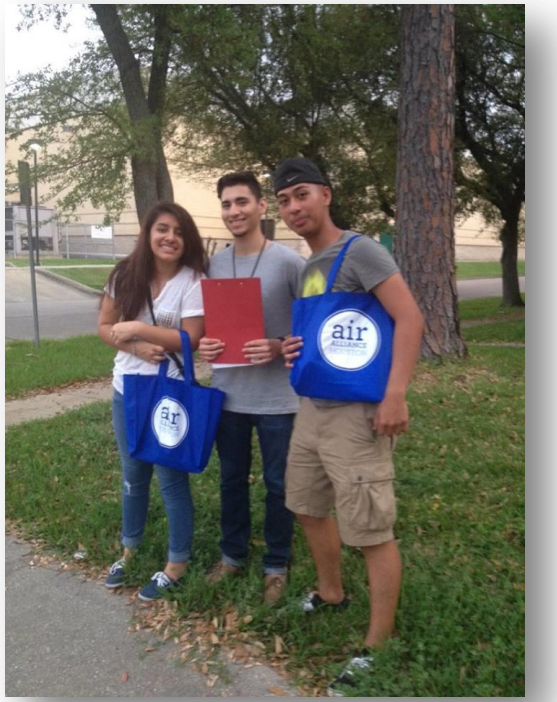
PROJECT ACTIVITIES

- Community Surveys
- Community Mapping Workshops
- Community Air Monitoring
- Community Advocacy for an “Anti-Idling” ordinance.



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CONCRETE BATCH PLANTS

ADVOCATING FOR RELIEF AND REGULATIONS

The concrete batch plants, which produce ready-mix concrete vital for building new roads and buildings, are given license to locate in residential areas and operate around the clock.

According to a Houston Chronicle analysis from February, Harris County has 188 facilities, more than any other county in Texas and twice the number in Dallas County. A study by the city last year of 40 batch plants found more than 40 violations, including inadequate dust control and visible emissions leaving property line.

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HOW WHERE WE LIVE, WORK, LEARN AND PLAY IMPACTS OUR HEALTH?

The placement of these facilities fits in with decades of environmental racism in Houston, where minority communities are disproportionately burdened with environmental degradation, said Bob Bullard, a professor at Texas Southern University and described by many as the father of environmental justice.

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PERMITS AND TCEQ

IF you ever receive notice stating that a permit for the construction of a new concrete batch plant has been submitted to the Texas Commission for Environmental Quality (TCEQ) for approval. Public records indicate that your home or property may be within 440 yards of this site should which entitle you to request a public meeting and contested case hearing from TCEQ

TCEQ will only hold a public meeting if an elected official requests a meeting or if there is significant interest in an application, so be sure to tell elected official(s) and neighbors that they should submit a request too.

- your name (or for a group or association, an official representative), mailing address, daytime phone number;
- (2) applicant's name and registration number
- (3) the statement "[I/we] request a contested case hearing"
- (4) a specific description of how you would be adversely affected by the application and air emissions from the facility in a way not common to the general public
- (5) the location and distance of your property relative to the facility
- (6) a description of how you use the property which may be impacted by the facility.

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BUCKET BRIGADE AIR SAMPLING

SUPPORTING DATA FROM AIR MONITORING ACTIVITIES

We have estimated that in Harris County a staggering 1 million pounds of pollution were released during the days immediately prior to and after the storm due to plant shut downs, start-ups, and malfunctions.

Over 40 pollutants were released during this time including some of the most harmful to health such as benzene, 1,3 butadiene, toluene, xylene, hexane, sulfur dioxide among others. We have study after study showing the link between heart attacks, asthma attacks, and other public health impacts from increased air pollution.

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BUCKET BRIGADE – COMMUNITY MONITOR

Forming a Bucket Brigade to document excessive pollution in a community is a big step in working to make a neighborhood environmentally safe. The Bucket Brigade is a proven method of success, and can offer technical and financial support for residents.

- Having specific technical information makes it possible to track and reduce health threats in your neighborhood.
- By using the toxic release inventory or national pollution inventory, a community group can identify which toxins are released by a specific facility and then create a health impacts assessment.

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ANTI-IDLING ORDINANCE

ANTI-IDLING ORDINANCE

Idle reduction describes technologies and practices that minimize the amount of time drivers idle their engines. Avoiding idling time has multiple benefits including: savings in fuel and maintenance costs, improving community health, and reducing air pollution exposure.

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REDUCING IDLING BENEFITS

COST

- The EPA estimates that one heavy-duty truck burns as much as 1,830 gallons of fuel annually due to unnecessary idling. That is equal to over $4,750 per year that could be saved by eliminating idling.
- The added wear of restarting the engine is much less costly than that of wasted fuel. Idling actually increases overall engine wear by causing the car to operate for longer than necessary.

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REDUCING IDLING BENEFITS

ENVIRONMENTAL

- The average truck produces about 21 tons of carbon dioxide annually while idling. For every 10 minutes your engine is off, you will prevent one pound of carbon dioxide.
- Diesel truck idling produces a complex mixture of thousands of different air pollutants including fine particulate-matter, nitrogen-oxides, carbon monoxide, volatile organic compounds, which are precursors to ozone formation.

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REDUCING IDLING BENEFITS

HEALTH

- Idling tailpipes spew out the same pollutants as moving cars which have been linked to serious illnesses including asthma, heart disease, chronic bronchitis, and cancer.
- Diesel particulates have been classified as an air toxic, can cause chronic disease, and carry the highest cancer risk of any other air toxic in the Houston region.

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DIESEL EXHAUST EXPOSURE ON STUDENTS

- Texas school children are exposed to diesel exhaust while riding on a school bus, while boarding or exiting from the school bus, while waiting for parent pick-up in areas adjacent to idling school buses and while indoors at school.

- Numerous studies have documented that diesel exhaust concentrations inside the bus are much higher than the levels outside the bus.

- Yale University researchers, in conjunction with Environment and Human Health, Inc., recorded pollution levels during school bus trips using a monitor attached to a child's backpack. The study revealed that students on school buses were exposed to levels of particulate pollution that were 5-15 times higher than background levels

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ANTI-IDLING ORDINANCES
GALENA PARK, JACINTO CITY, AND THE CITY OF HOUSTON

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Air Alliance Houston's mission is to improve air quality and protect public health trough research, education, and advocacy.

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