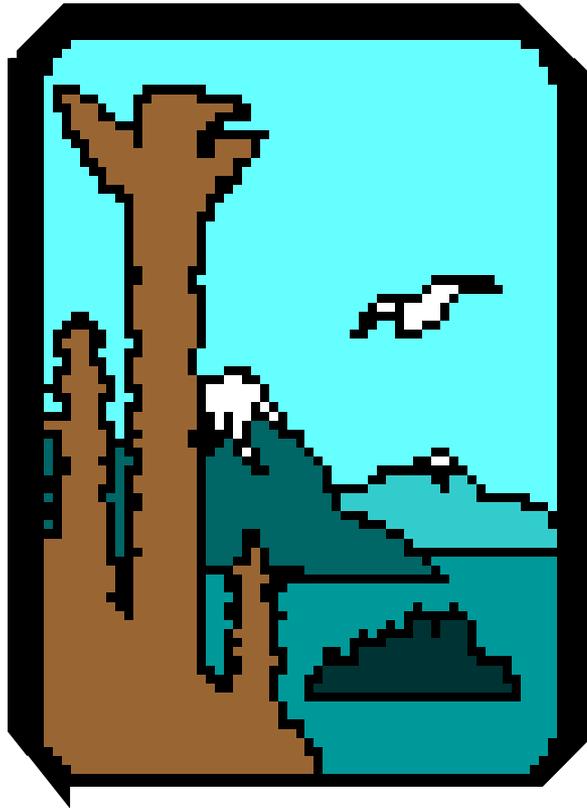




15th ANNUAL ATCEM CONFERENCE

AIR QUALITY
ISSUES FOR
NATIVE
ALASKANS

Alaska Department of Environmental Conservation



Division of Air Quality
Air Monitoring & Quality
Assurance Section

Bob Morgan
(907) 269-3070

bob.morgan@alaska.gov

619 East Ship Creek Ave Suite 249
Anchorage Alaska 99501

WHAT IS AIR POLLUTION?

Air pollution is any substance introduced to the surrounding air that is harmful to:

- Human health
- Animal life
- Plant life
- Property
- Enjoyment of Life

Harm Caused by Air Pollution

Harmful to Plants & Animal



Harmful to Human Health



Interferes with a Joyous
Life

Harmful to Home & Property



Harmed Caused by Air Pollution

Human Health – Those at the Greatest Risk



Elders

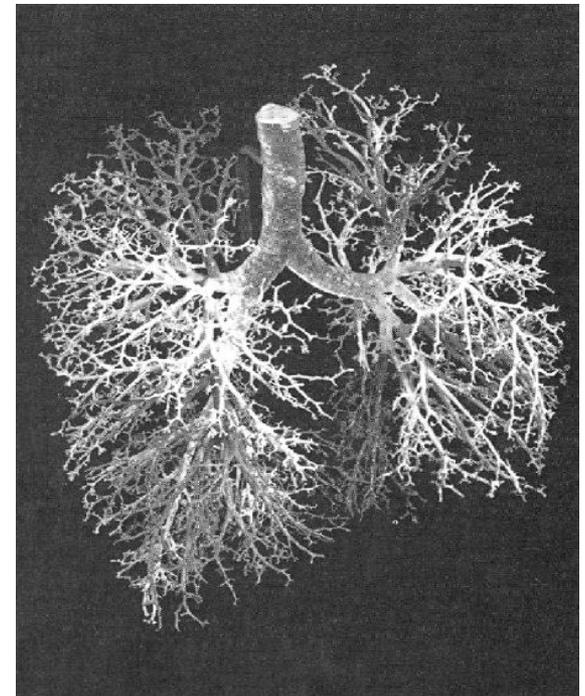
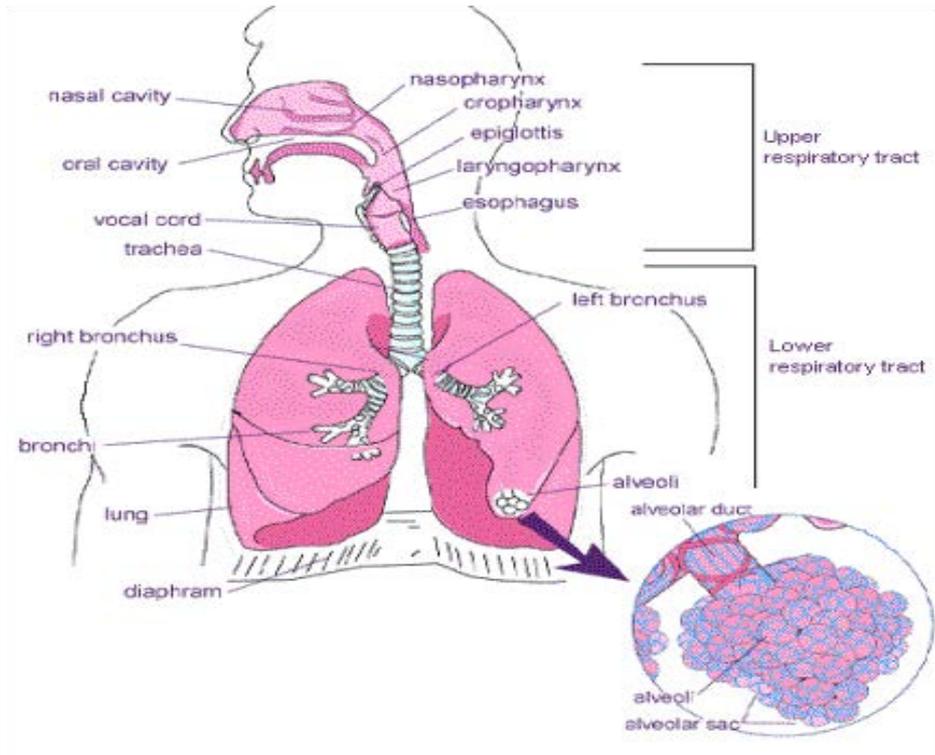


Children

- People with heart or lung disease
 - Conditions make them vulnerable
- Older adults
 - Greater prevalence of heart and lung disease
- Children
 - More likely to be active
 - Greater particle deposition than adults
 - Developing bodies make them vulnerable

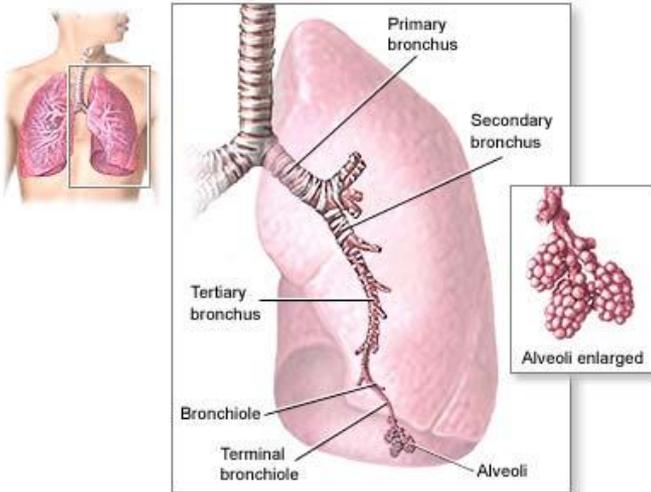
Harm Caused by Air Pollution

Human Respiratory System



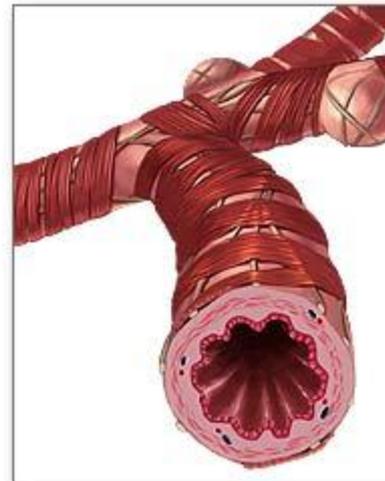
Harm Caused by Air Pollution

Asthma

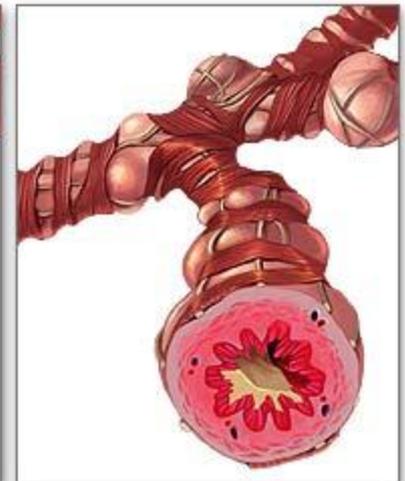


ADAM.

Normal bronchiole



Asthmatic bronchiole



ADAM.

Harm Caused by Air Pollution

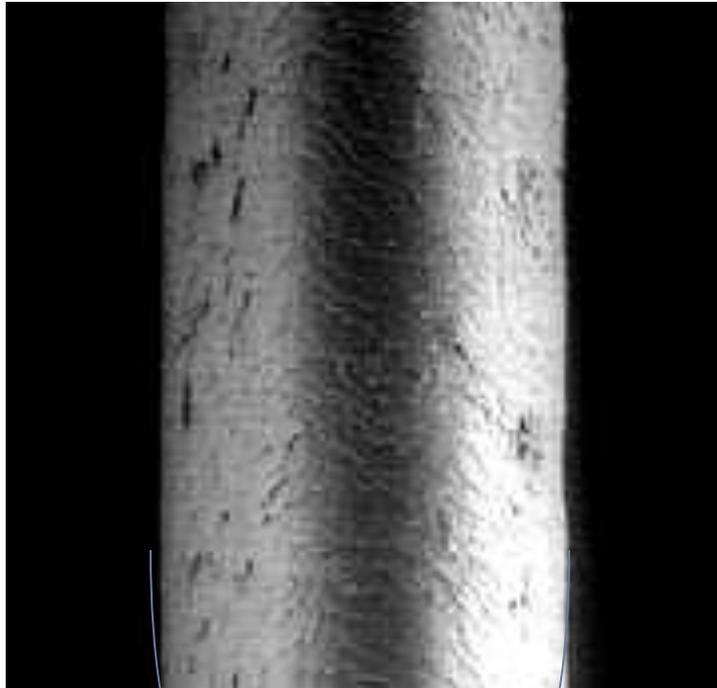
Cardiovascular Disease

- Adverse effects
 - Constriction of blood vessels
 - Increase in blood pressure
 - Reduces blood's capacity to carry oxygen
 - Heart attacks
 - Cardiac arrhythmias
- Indicators of increased risk
 - Cardiac arrhythmias
 - Increased heart rate or variability in heart rate
 - Changes in blood chemistry

In what form does air pollution exist?

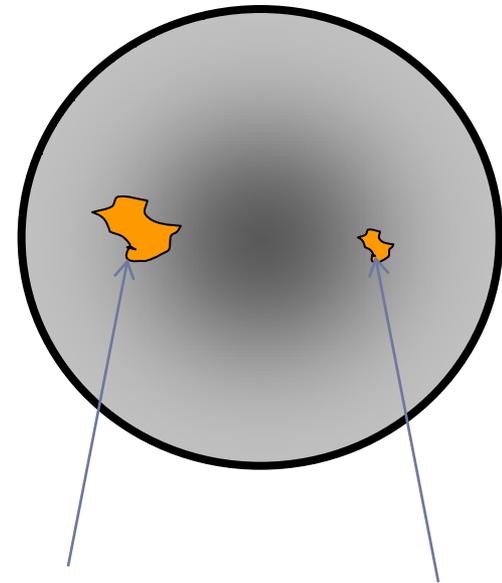
- Solid particles (dust, soot, ash)
- Gases (carbon monoxide, sulfur dioxide, nitrogen oxides,)
- Aerosols (mists, fumes)
- Or a combination of all three (wood smoke, diesels emissions)

Air Pollution – Particulate Matter (PM)



Human Hair – Diameter $\sim 60\mu\text{m}$

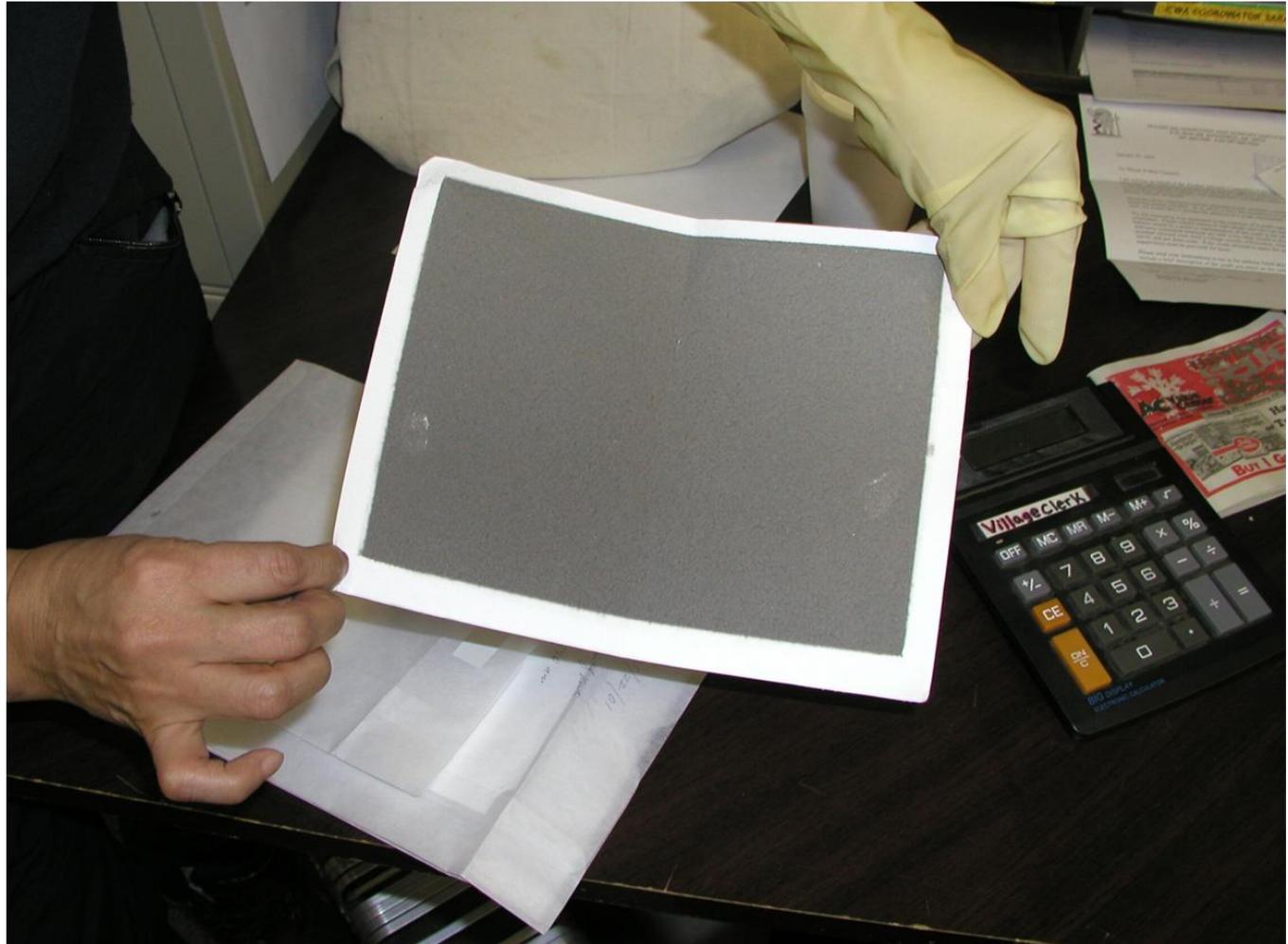
Cross-Section of a Human Hair $\sim 60\mu\text{m}$



PM-10 μm
Dust
Particles

PM 2.5 μm
Combustion
Particles

Air Pollution – Particulate Matter (PM) – Filter Sample from Noatak





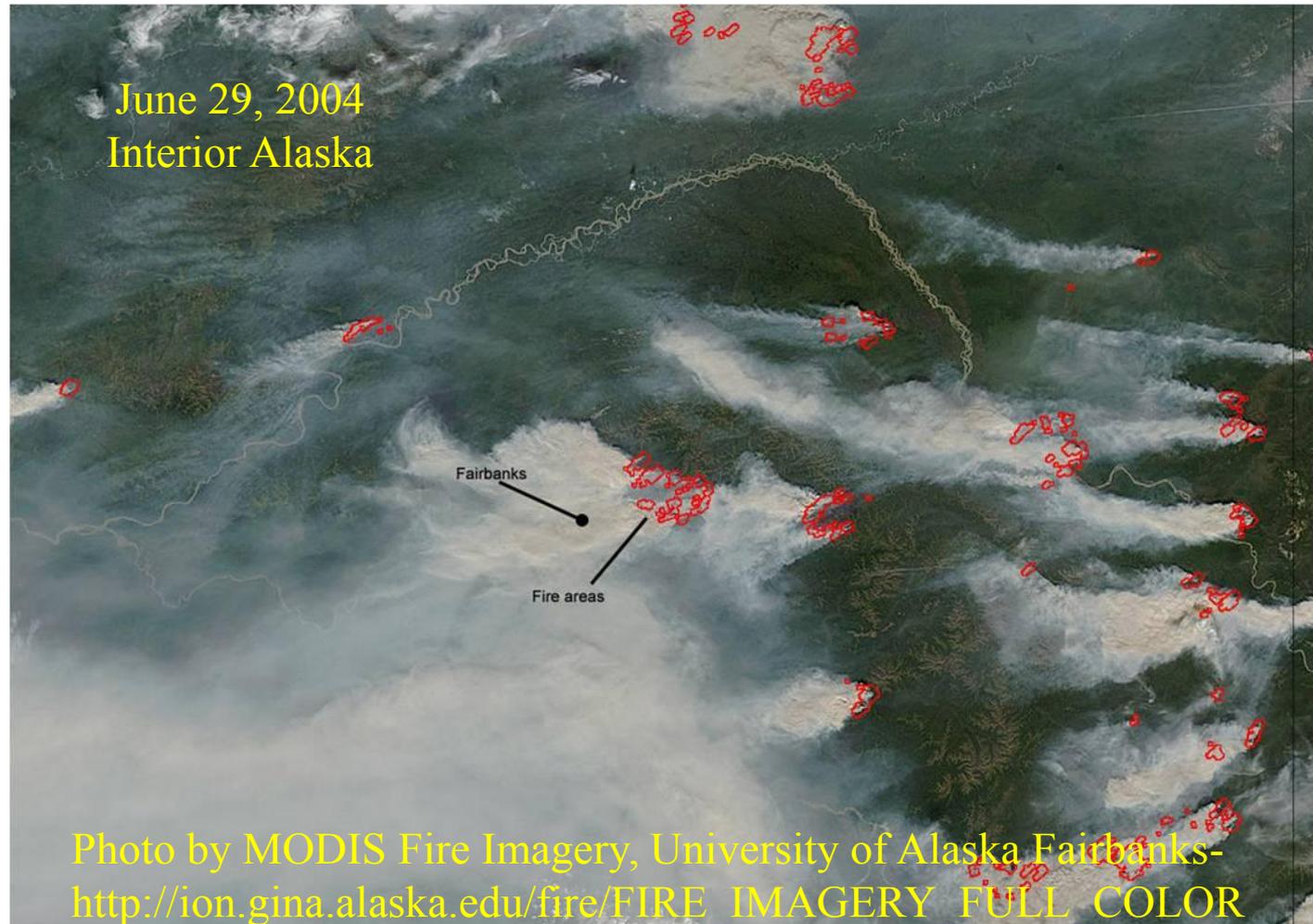
Air Pollution Source in Rural Alaska

Natural Sources
&
Man-Made Sources

NATURAL SOURCES OF AIR POLLUTION – Wind Blown Dust



NATURAL SOURCES OF AIR POLLUTION – Forest Fires



NATURAL SOURCES OF AIR POLLUTION – Forest Fires



**South Fairbanks
June 28, 2004. Air quality
particulate level at
approximately 900 ug/m³**

**South Fairbanks
July 6, 2004. Air quality
particulate level at
approximately 10 ug/m³**



NATURAL SOURCES OF AIR POLLUTION – Volcanic Eruptions



Mt. Redoubt – March 31, 2009

Man-Made Sources of Air Pollution-

Road Dust



Man-Made Sources of Air Pollution

Combustion – Burning chemicals or materials:

Burning fuels in a way to produce power, heat, light, transportation or waste reduction to improve our way of life, for personal enjoyment or to survive.

Common sources:

- Power plants
- Dump burning
- Vehicles
- Wood stoves and boilers
- 4-wheeler and snow machine engines
- Boat motors
- Home heating and cook stoves
- Airplane engines

Man-Made Sources of Air Pollution-

Power Plant Diesel Emissions

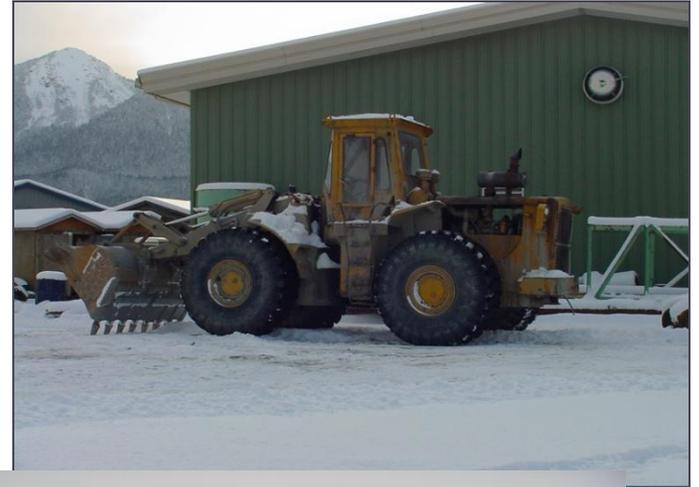


Man-Made Sources of Air Pollution-

Dump Burning



Man-Made Sources of Air Pollution- Vehicle Emissions



Courtesy of ADN

Man-Made Sources of Air Pollution-

Venting: release of vapor into the air:

Emitting vapors or gases into our air where we can breathe them.

Common sources:

- gasoline
- solvents
- cleaning products
- airplane/Honda exhaust
- paints
- glues



Being Aware of Air Quality Issues & Managing Air Pollution will Protect:



the people, the environment
& the way of life



Photos courtesy of ADN



**Alaska Department of Environmental Conservation –
Division of Air Quality**

**Barbara Trost – Program
Manager Air Monitoring
& Quality Assurance**

Phone: (907) 269-6249

Email: barbara.trost@alaska.gov

Address

DEC/AQ Monitoring and Quality
Assurance

619 E Ship Creek Ave., Suite 249
Anchorage AK 99501

**Bob Morgan – Manager
Field Monitoring**

Phone: (907) 269-3070

Email: bob.morgan@alaska.gov

Address

DEC/AQ Monitoring and Quality
Assurance

619 E Ship Creek Ave., Suite 249
Anchorage AK 99501