

*Missoula: Ethanol as an
Oxygenate and Bio-Fuel
Stove and Boiler Rules*



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Missoula County's Historic CO problem

- High CO Levels First Noted in the 1970's
- 8-Hour Average CO Concentrations Over 9 ppm Found Between 1985-1992
- Federal Clean Air Act Amendments of 1990 Required Oxygenated Vehicle Fuel in Missoula
- In 1992 MTBE was used– unpopular, public requested an alternate oxygenate
- For the 1992-93 winter, switched oxygenate to ethanol – Dodged the water quality issues found with MTBE

Oxygenated Fuels Program

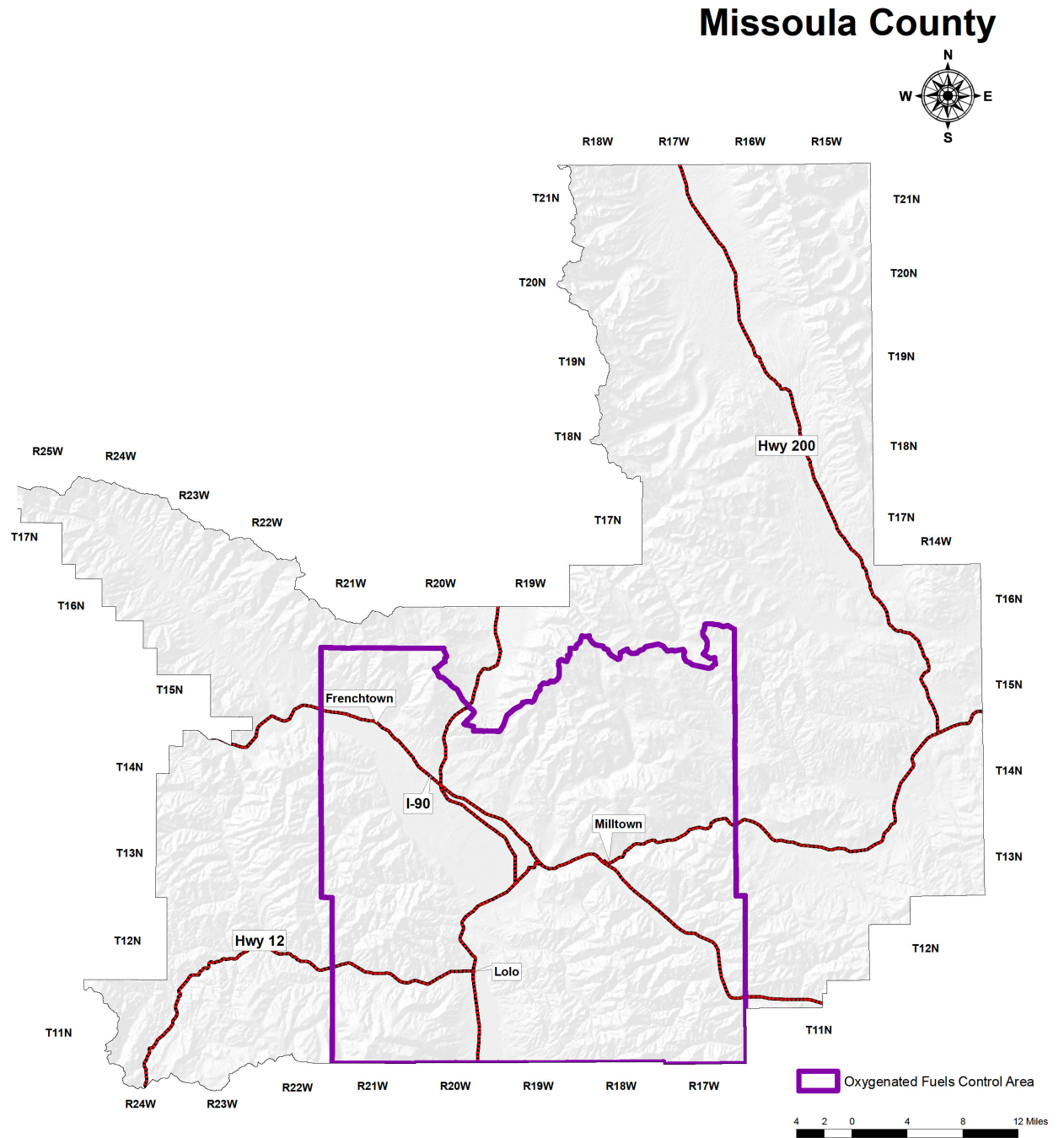
- Requires Blenders to have 2.7% by weight oxygen in all fuel distributed in Missoula County control area
- November 1 through the end of February each winter

Players in the Oxygenated Fuels Program



- **BLENDERS (In line blending at terminal)**
 - CHS
 - CONOCO (WITH EXXONMOBIL)
- **FUELING FACILITIES**
 - ABOUT 70 IN THE CONTROL AREA

MAP of Oxygenated Fuel Control Area



Sources of Carbon Monoxide Winter 1990 and 2000

	<u>1990</u>	<u>2000</u>
• Vehicles	63.8 %	85.6%
• Wood stoves	26.1 %	9.7%
• Industry	9.6 %	0.4%
• Airplanes	0.5 %	0.6%

- Compliance must be met in worst location in the airshed.....Malfunction Junction!
- Note, between 1990 and 2000, CO emissions plummeted – the pie is smaller.

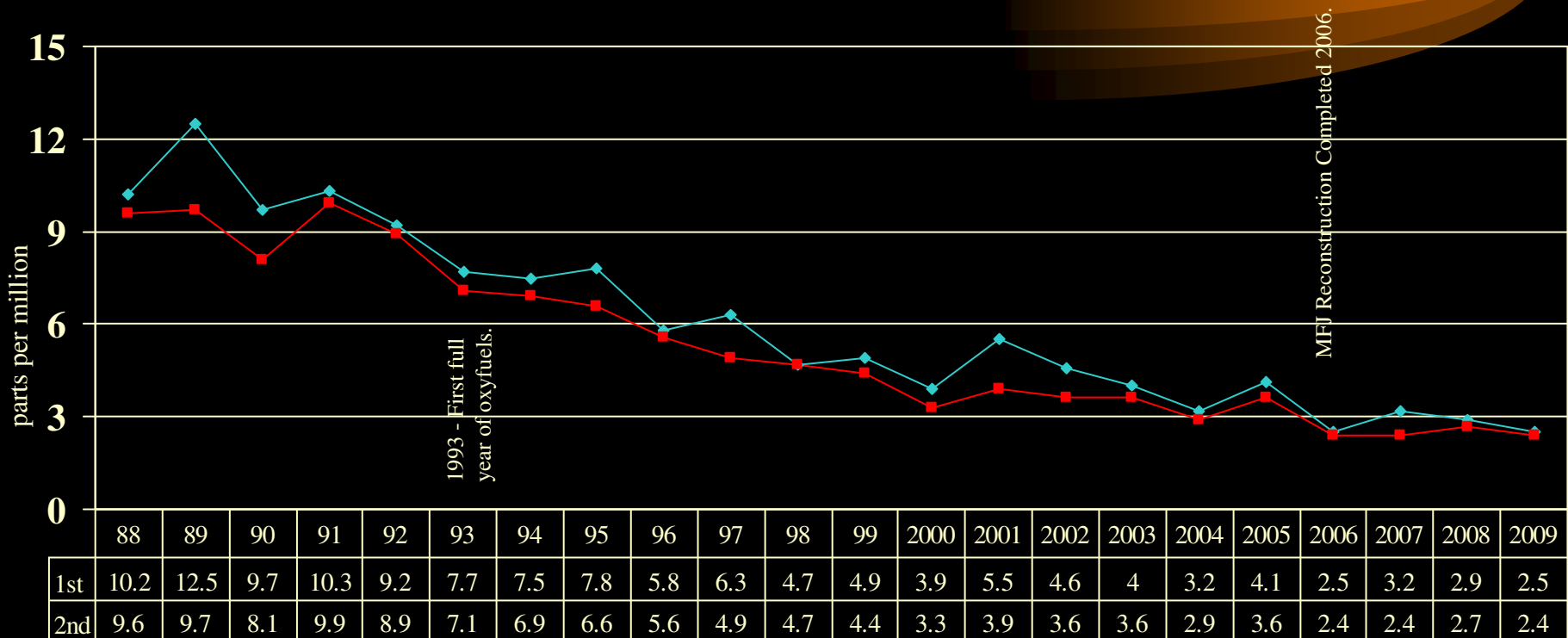
Sources of Carbon Monoxide



- Compliance must be met in worst location in the airshed.....Malfunction Junction!

Missoula Carbon Monoxide Levels

1988-2009 Malfunction Junction
1st and 2nd Highest 8-Hour Average



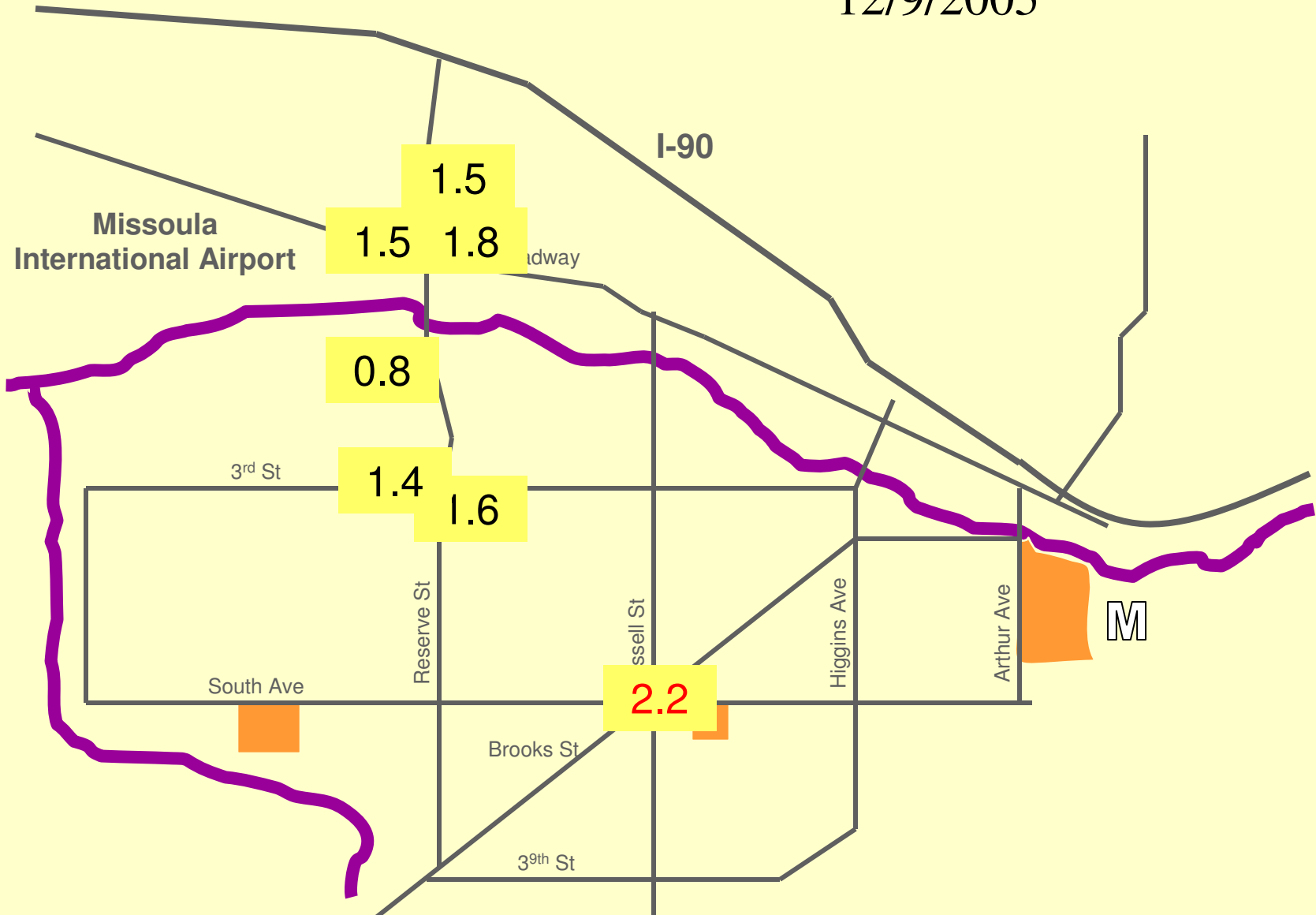
Federal 8-Hour Average Standard = 9 parts per million, not to be exceeded more than once per calendar year.

Carbon Monoxide Redesignation

- With all the new traffic on Reserve Street are we really in compliance?
- MCCHD performed a 2005-2006 winter CO study to verify that CO standard was met
- Mullan and Reserve usually higher than MFJ
- Brooks-South-Russell comparable

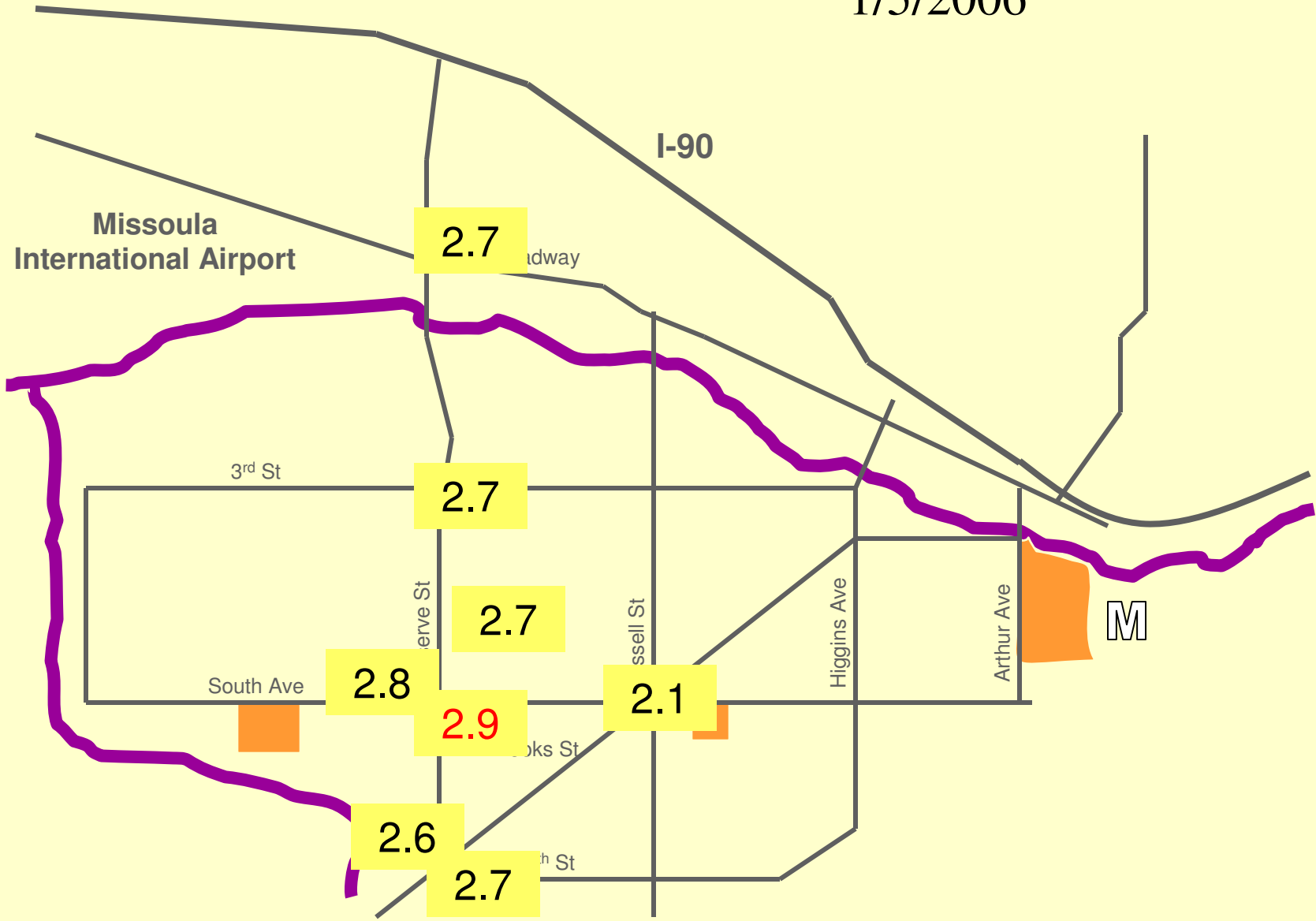
2005-2006 CO Study

12/9/2005



2005-2006 CO Study

1/5/2006



Ethanol Distribution Compliance

- 2007 97% COMPLIANT – of gas stations tested
- 2008/2009, 100% COMPLIANT
- 2009/2010, 100% COMPLIANT

- Gas stations now say they may use ethanol year round for cost savings regardless of the rule – this wasn't the case when the program started

Biofuels in Missoula County



National Ambient Air Quality Standard – Affects Biofuels

Standard		Old ($\mu\text{g}/\text{m}^3$)	New ($\mu\text{g}/\text{m}^3$)
PM ₁₀	Daily	150	150
	Annual	50	---
PM _{2.5} ("fine")	*Daily	65	35
	**Annual	15	15

*Daily standard based on 3 year average of yearly 98th percentile value.

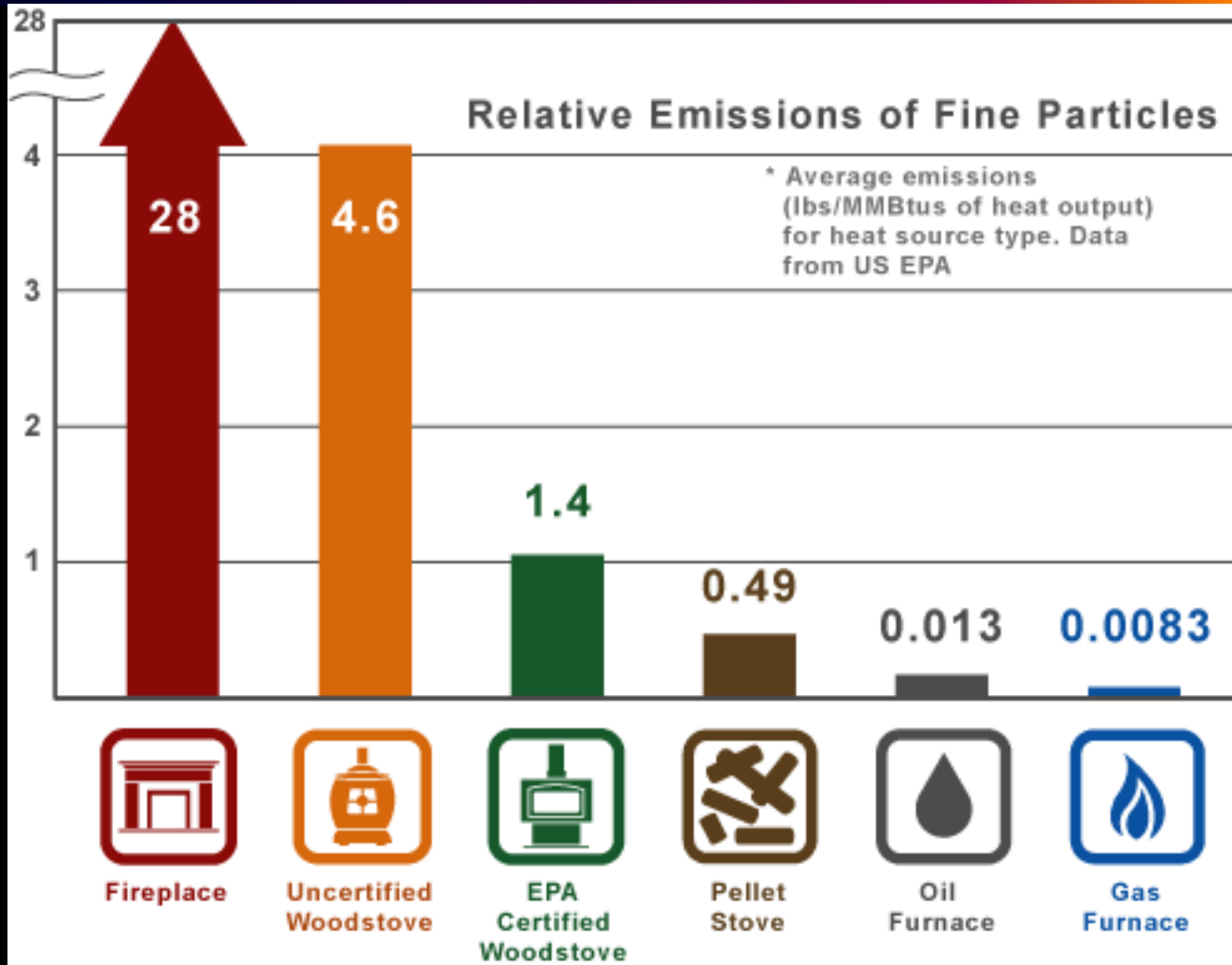
**Annual standard based on three year average.

Missoula's 24-Hour PM_{2.5} Standard Design Values

2002 – 2004 µg/m³	2003 – 2005 µg/m³	2004 – 2006 µg/m³	2005 – 2007 µg/m³	2006 – 2008 µg/m³	2007 – 2009 µg/m³
33	39	41	35.2	29.9	25.8

Relative Emissions of Fine Particles

$PM_{2.5}$



Missoula County – Outside the Missoula Air Stagnation Zone

- The following residential scale solid fuel burning devices can be installed in Missoula County.
 - EPA Certified Stick or Pellet Stoves.
 - Outdoor Wood Fired Heaters meeting the voluntary EPA Phase 2 Certification.
 - Other devices with emissions equal to or better than an EPA certified device. Test accepted include EPA testing method or alternative method approved by the department. Corn, pellets or wood could be fuels.
 - Devices with heat input capacities between 250,000 and 1,000,000 BTU/hr must meet an emission rate of 0.9 grams/hr per 10,000 BTU heat input.

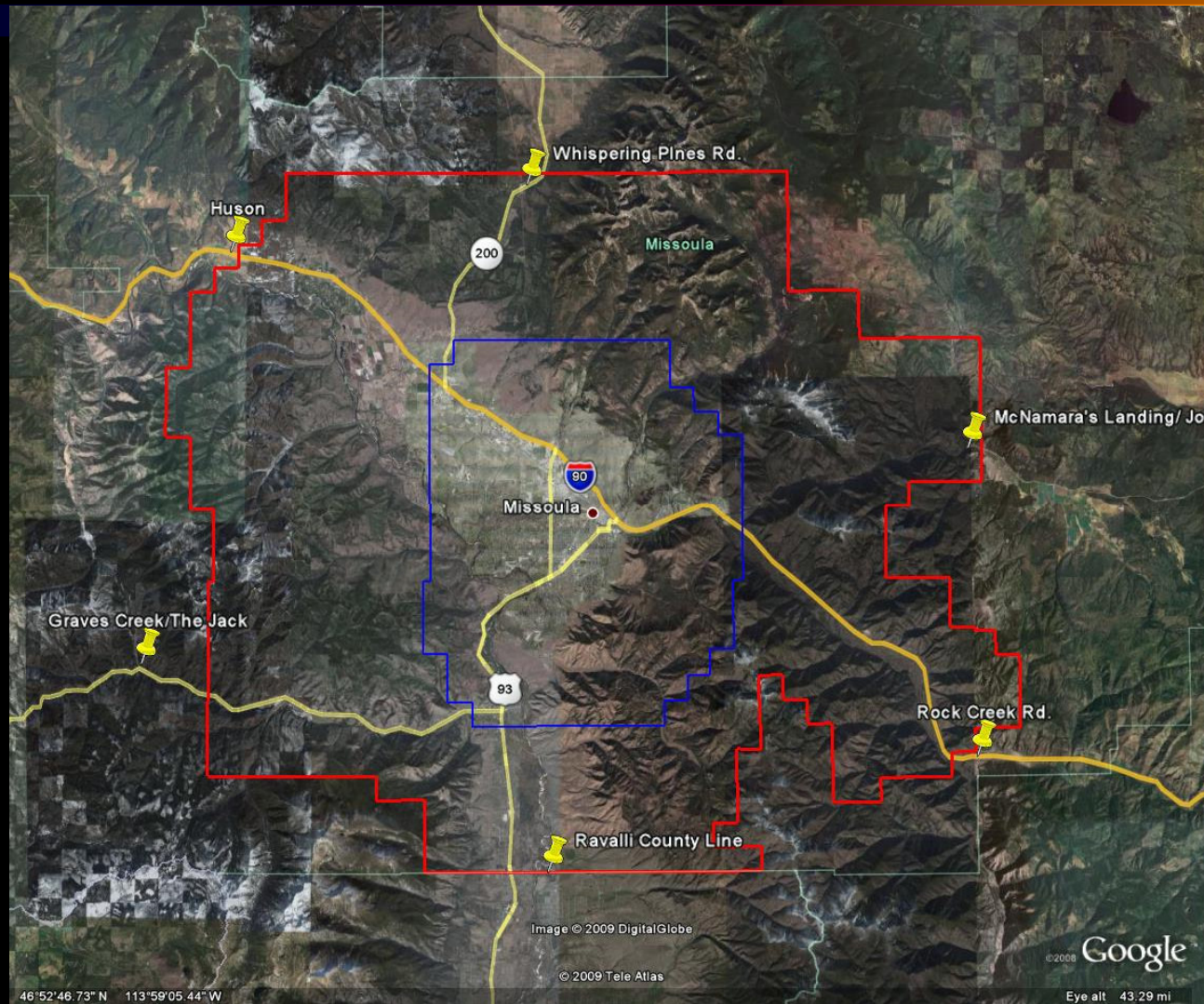
Solid Fuel Boilers – Wood, Coal etc.

- Require permits for boilers installed in Missoula County
 - Throughout the county, require solid-fuel burning equipment with the heat input capacity to burn 1,000,000 BTU/hr or more to get an Air Quality Permit.
- Set a stringent PM_{2.5} emission limit for small boilers
 - Solid-fuel burning equipment with heat input capacity to burn 1,000,000 to 10,000,000 Btu/hr in the Air Stagnation Zone must meet LAER and cannot have particulate emissions in excess of 0.1 pounds per million Btu/hr heat input.
 - Solid-fuel burning equipment with heat input capacity to burn 1,000,000 to 10,000,000 Btu/hr in the County but outside the Air Stagnation Zone must meet BACT and cannot have particulate emissions in excess of 0.2 pounds per million Btu/hr heat input.

Future of Biofuels in Missoula County

- Additional fuels for schools type boilers
- Meeting increasingly strict PM levels
- Opportunities for alternative sources of energy
- Biodiesel has been used by Mountain Line and the City
- Ethanol from cellulose may be viewed favorably

Missoula Air Stagnation Zone and Zone M





END