

# Environmental Impacts of Hydrofracturing Air Emissions Compliance, Measurement, and Control

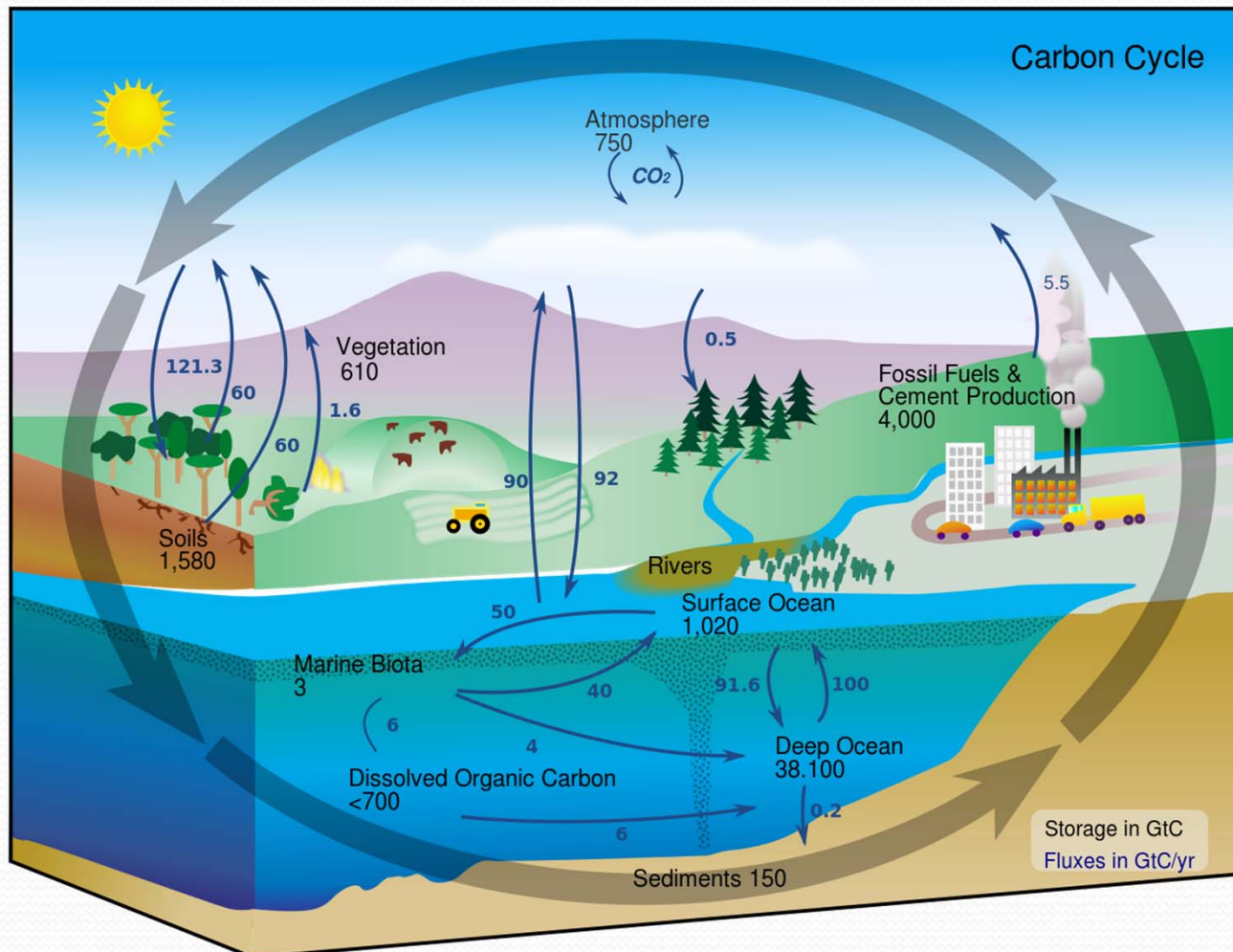
Burleson & Milam Counties – Groundwater Summit

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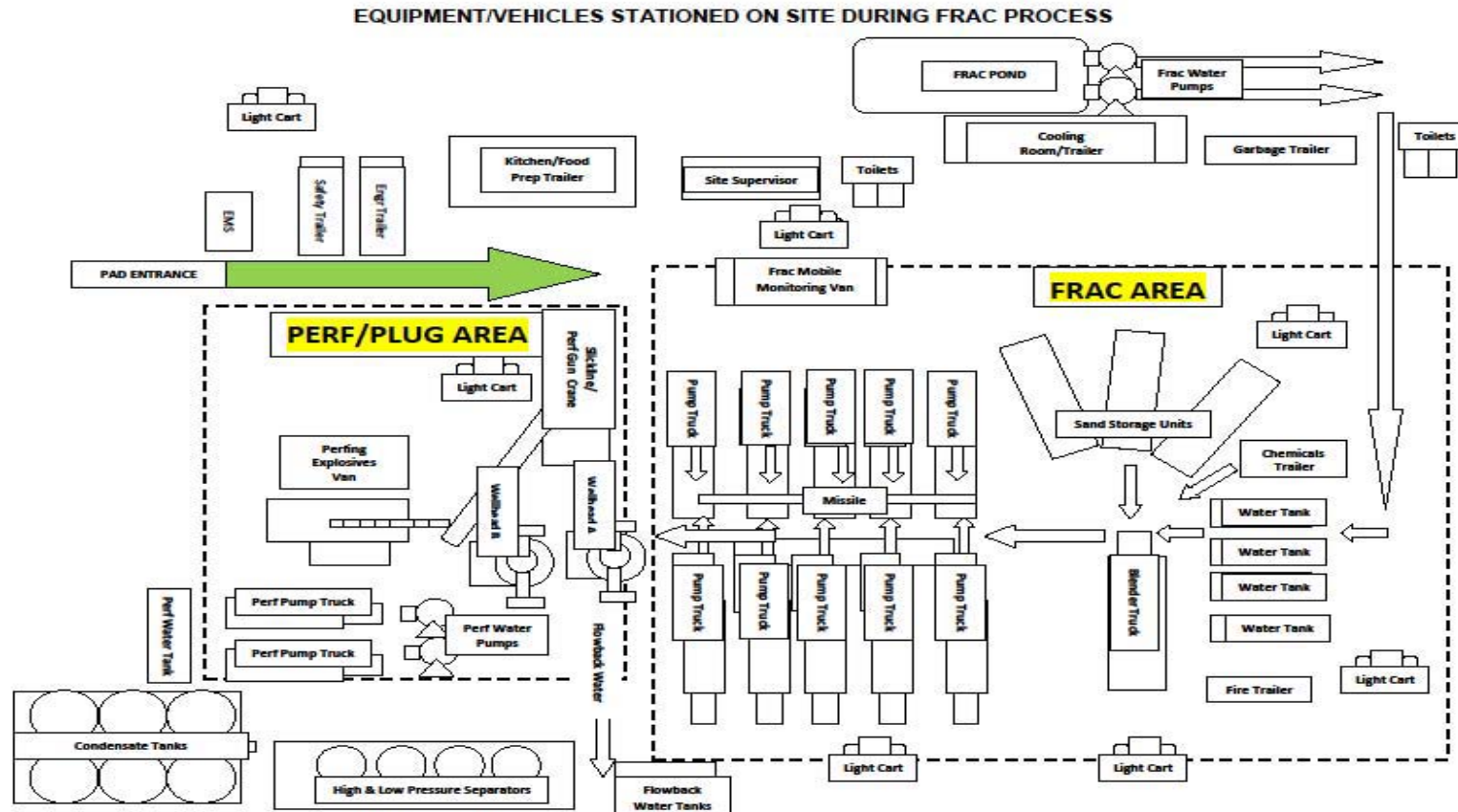
August 13, 2014



# Environmental Impacts of Hydrofracturing – Water, Air, Land Air Emissions



# Air Emission Sources and Pollutants





# Air Emissions

## Sources and Pollutants

### Sources

- 2250 Hp Pump engines
- Pond pumps
- Idling Trucks – Large/semi & pick-ups
- Equipment (cranes, forklifts, construction, etc.)
- Light carts/generators
- Tanks (Condensate/Oil)
- Unpaved roads

### Pollutants

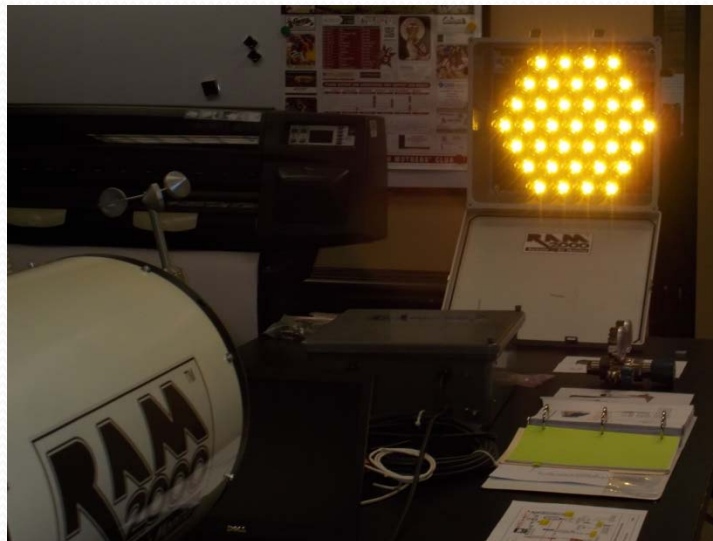
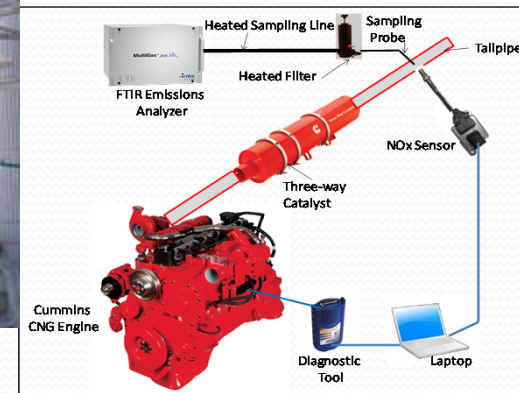
- Criteria/NAAQs – NO<sub>x</sub>, CO, PM<sub>10</sub>, Ozone/VOC, SO<sub>x</sub>,
- Hazardous Air Pollutants – B-T-E-X, Formaldehyde, etc.
- Greenhouse Gas Pollutants – Methane, CO<sub>2</sub>



# Measure/Estimate Emissions

- Sampling
  - Ambient Monitoring
  - Stack Sampling
- Modeling
  - EPA TANKS Model
  - Dispersion/bLS
  - EPA Water 9
  - EPA Nonroad/MOVES
- Emission Factors (EFs)
  - Industry/Agency Approved Factors
    - EPA AP-42
    - EPA/CARB Engine Certificate
    - State (for Minor Sources (non-federal) permits/PBRs)

# Measure/Estimate Emissions





# Reducing Air Emissions from Hydrofracturing and other O&G Processes

- More and better monitoring and testing
  - Optical methods (OP-FTIR, Infrared Camera, etc.)
  - Testing of new engine technology (Tier IV, dual-fuel)
- More stringent air quality regulations – Federal & State
  - Federal Standards
  - State Air Permits – Standard Permit for O&G, PBRs
  - Better Emission Controls – BACT requirements
  - GHG regulations/permitting
- Improve the Quality of Emission Estimation
  - Based on source testing (engines, tanks, etc.)
  - Current technology (dual fuel, Tier IV)
  - Better emissions models and calculations
- Better Emissions Controls
  - Diesel Oxidation Catalysts
  - Alternate Fuels/Energy (NG, Solar, etc.)
  - Capture
  - Green Completions (GHG)
  - Etc (MAJOR TOPIC AREA!!!!)



# Contact Information

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