

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

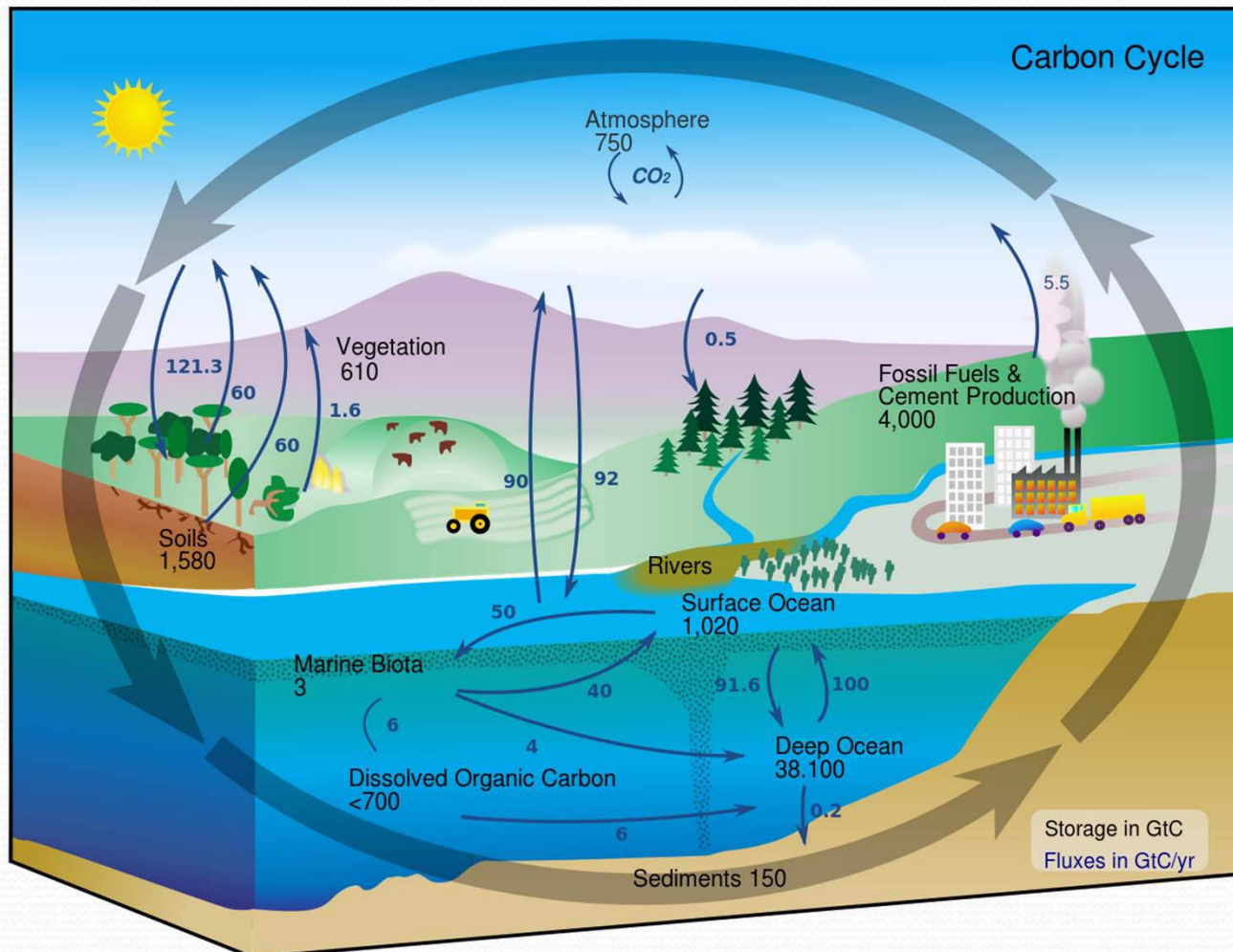
Burleson & Milam Counties ☐ Groundwater Summit

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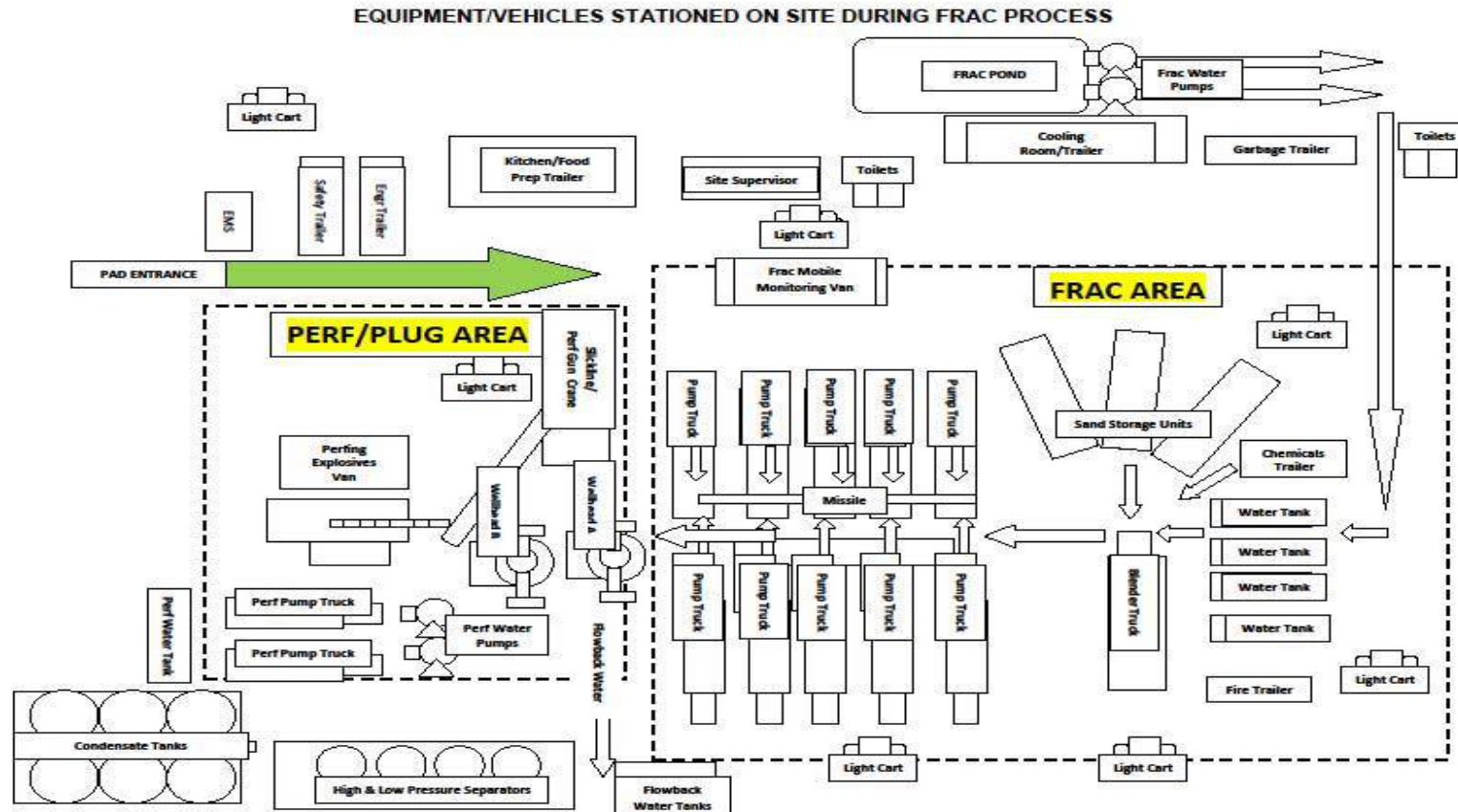
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Environmental Impacts of Hydrofracturing ☐ Water, Air, Land Air Emissions



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

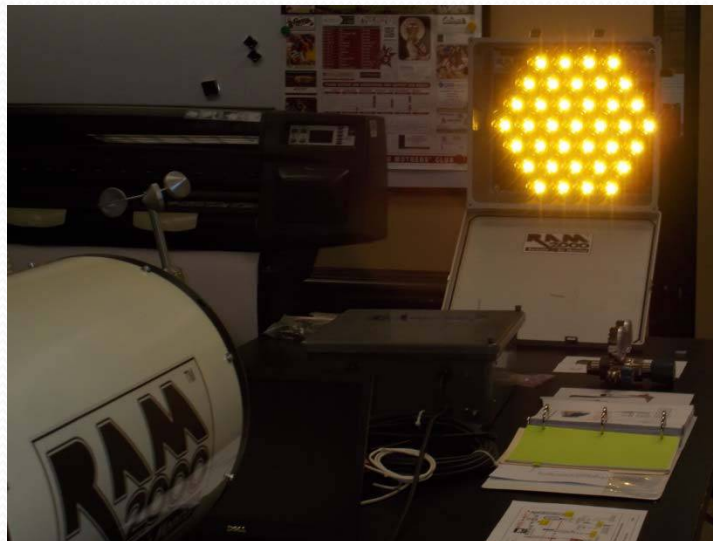
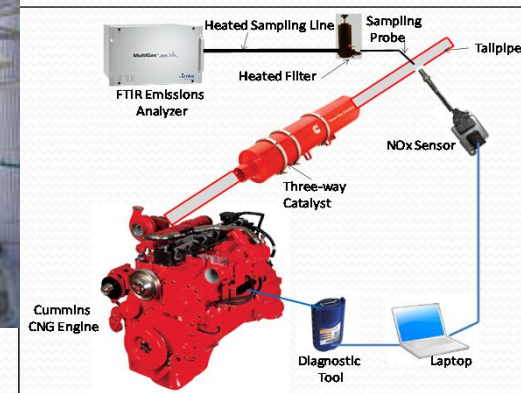
- Criteria/NAAQs ☐ NO_x, CO, PM₁₀, Ozone/VOC, SO_x,
- Hazardous Air Pollutants ☐ B-T-E-X, Formaldehyde, etc.
- Greenhouse Gas Pollutants ☐ Methane, CO₂



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!!!!)



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