



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration



Panel on Climate Change



Safety Advisory Committee Meeting

12/10/2009



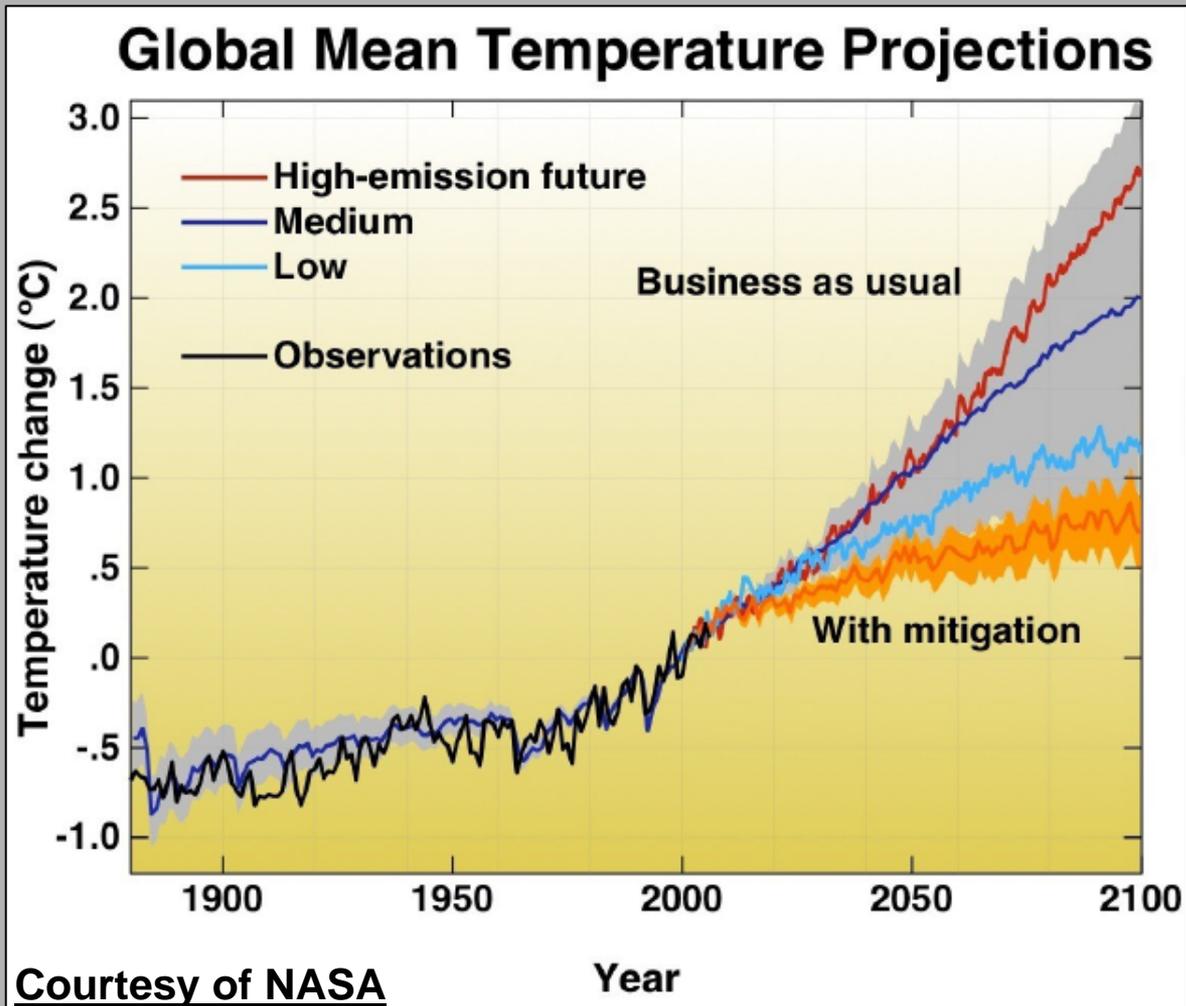
Climate Change (?)



- How may pipelines be impacted?
- Who is driving the change in focus?
- How is PHMSA addressing the issue?
- What can we do to protect pipelines?



The Planet is Warming!



- Best science says count on a 0.4°C to 1.4°C global warming by 2050
- We can't reverse the warming in the short term



Sea Level Rise?

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Environment

Going Green

Sea level rise could cost port cities \$28 trillion

By Peter Wilkinson, CNN
November 23, 2009 9:40 a.m. EST



The melting of ice caps in Greenland and the Antarctic could mean sea levels rising by 0.5 meters, the report says.

London, England (CNN) -- A possible rise in sea levels by 0.5 meters by 2050 could put at risk more than \$28 trillion worth of assets in the world's largest coastal cities, according to a report compiled for the insurance industry.

The value of infrastructure exposed in so-called "port mega-cities," urban conurbations with more than 10 million people, is just \$3 trillion at present.

STORY HIGHLIGHTS

- Possible rise in sea levels by 0.5 meters by 2050 could put at risk more than \$28 trillion worth of assets, report says

The rise in potential losses would be a result of expected greater urbanization and increased exposure of this greater population to catastrophic surge events occurring once every 100 years caused by rising sea levels and higher temperatures.





Congressional and EPA Actions

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Climate Change Bill Moves Forward... Toward Natural Gas Industry

FERC Moves Big Ruby Pipeline Forward

By Stephen Barlas, Washington Editor | AUGUST 2009 VOL. 236 NO. 8



The climate change bill the Senate will consider in September — which the House passed by a narrow 219-212 vote in late June — could have a significant impact on various players in the natural gas business; but the key word is could.

The Senate may change some provisions in the American Clean Energy Security Act of 2009, and may or may not pass the bill even after making changes. Some Democrats have threatened to defect because of the potential affect of mandated carbon emission reductions on their states.

While the pipeline industry has been relatively quiet, the legislation would force compressor stations emitting more than 25,000 metric tons a year of carbon-equivalent emissions to reduce those emissions 17% by 2020. It is unclear how many compressor stations are above that level. The EPA proposed a rule earlier this year that would require all sources of greenhouse gas (GHG) emissions to report on facility-based emissions above 25,000 metric tons starting Jan 1, 2011. The Interstate Natural Gas Association of America (INGAA) has pressed the EPA to

make changes in that proposal, including delaying reporting for one year.

- Waxman/Markey & Boxer/Kerry
- Big impact on fugitive methane reduction & on Trans/Dist systems
- We've invited Jerome Blackman from the EPA to summarize recent events on reducing CH4 emissions



CH₄ Reduction: Related PHMSA Actions

- **Overall Regulatory Program** – Keeping product in the pipeline and preventing leaks
- **Integrity Management (IM) Rulemaking** – Enhanced transmission industry programs to find and fix leaks since 2004
- **Distribution IM Program Rulemaking** – Proposed requirements to find and fix leaks in the distribution system





CH₄ Reduction: Related PHMSA Actions

- **PHMSA 2008-0291 Mandatory Reporting –**
Proposing a 3,000 MCF volumetric basis for natural gas incident reporting
 - This is a change from the previous dollar amount based reporting requirement initiated in 2004
 - The current change addresses both Unintentional and Intentional release of gas
 - Improved reporting will lead to improved risk picture



CH₄ Reduction: Related PHMSA Actions

- **Research & Development** – A collaborative and co-funded program since 2002 is bringing technology solutions to market
- **Excess Flow Valves** – Mandatory installation of EFVs on new and replaced residential service
- **Increasing Pipeline Capacity** – Conducted rulemaking to improve throughput efficiency in cross border pipelines



Biofuel Pipelines

- Pipelines are feasible transportation options!
- A comprehensive collaborative program is well underway and removing the known regulatory and technical challenges in the US
- Kinder Morgan (KM): Now transporting ethanol batched with gasoline in FL and biodiesel (B2) in OR
- Equistar & KM: Now offloading ethanol in and around greater Houston, TX
- Several other pipeline operators are conducting batch testing with ethanol and biodiesel



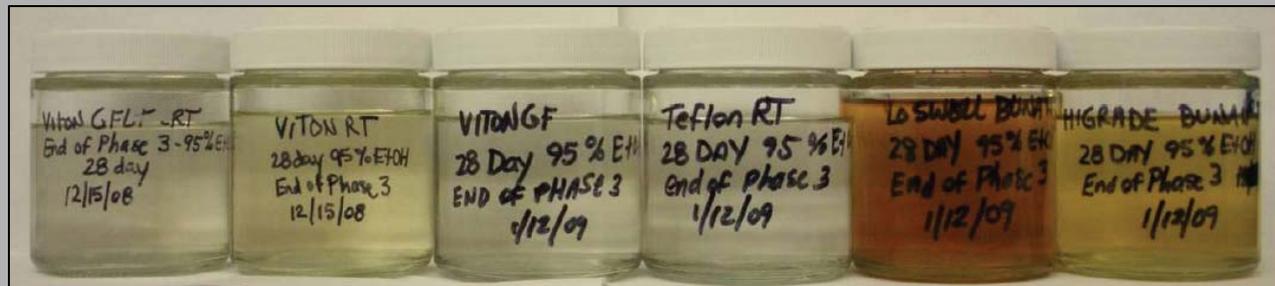
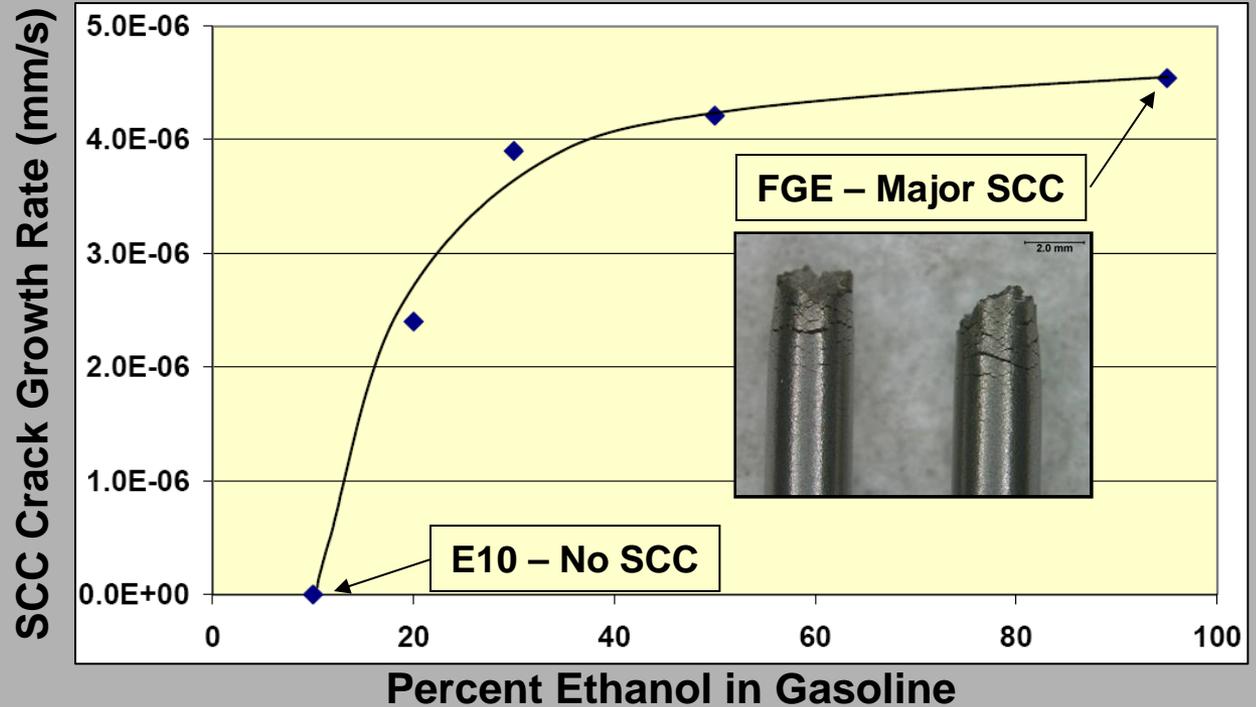
Ethanol Testing

SCC Potential in Ethanol Blends

Slow Strain Rate Testing



Simulated Pipeline Conditions



Elastomers Swell and Leach



Biodiesel

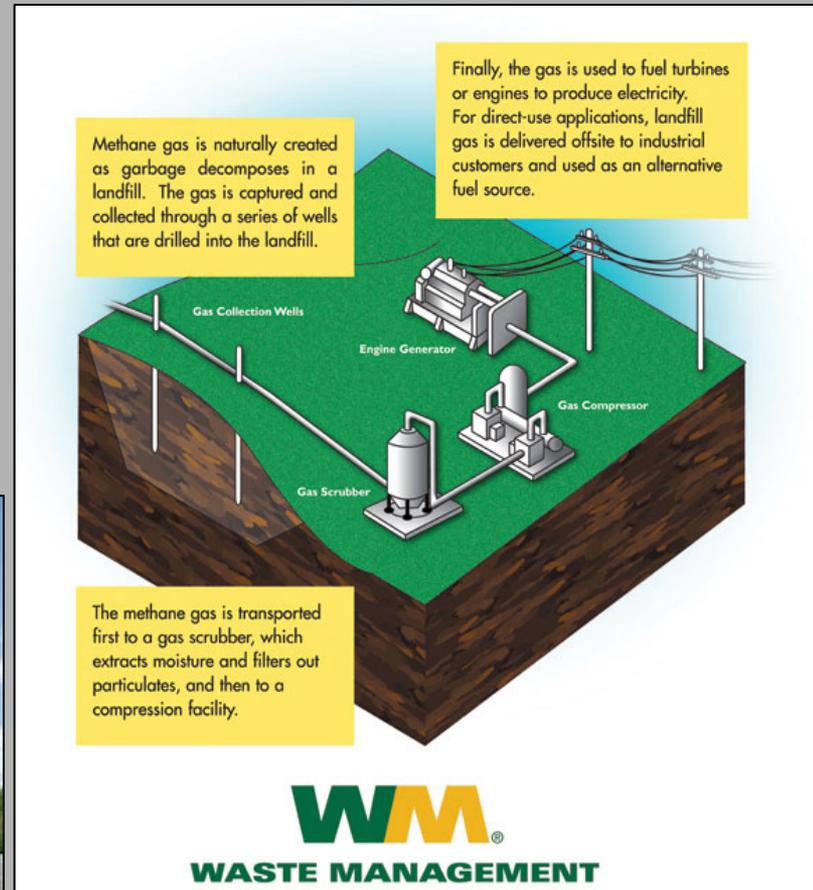
- No serious integrity threats such as SCC were seen in biodiesel tank storage and therefore pipelines
- However, many of the same quality assurance & quality control issues are seen with batching biodiesel
- But, the performance of biocides and other corrosion inhibitors are in question with biodiesel service
- Research now being solicited to investigate inhibitor impact(s)





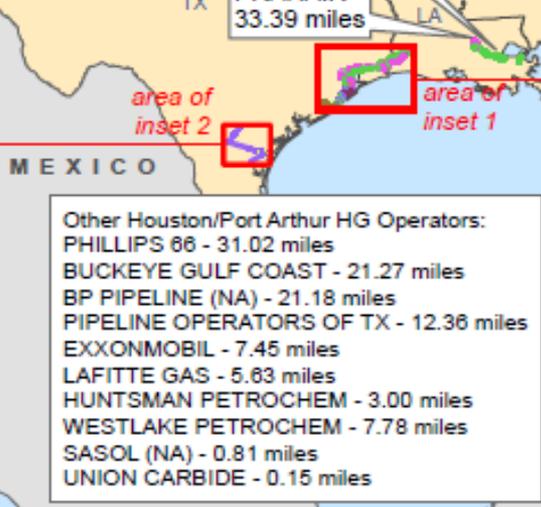
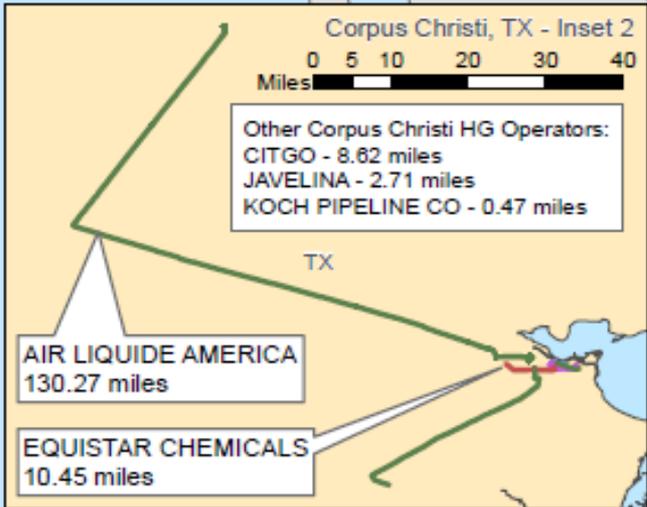
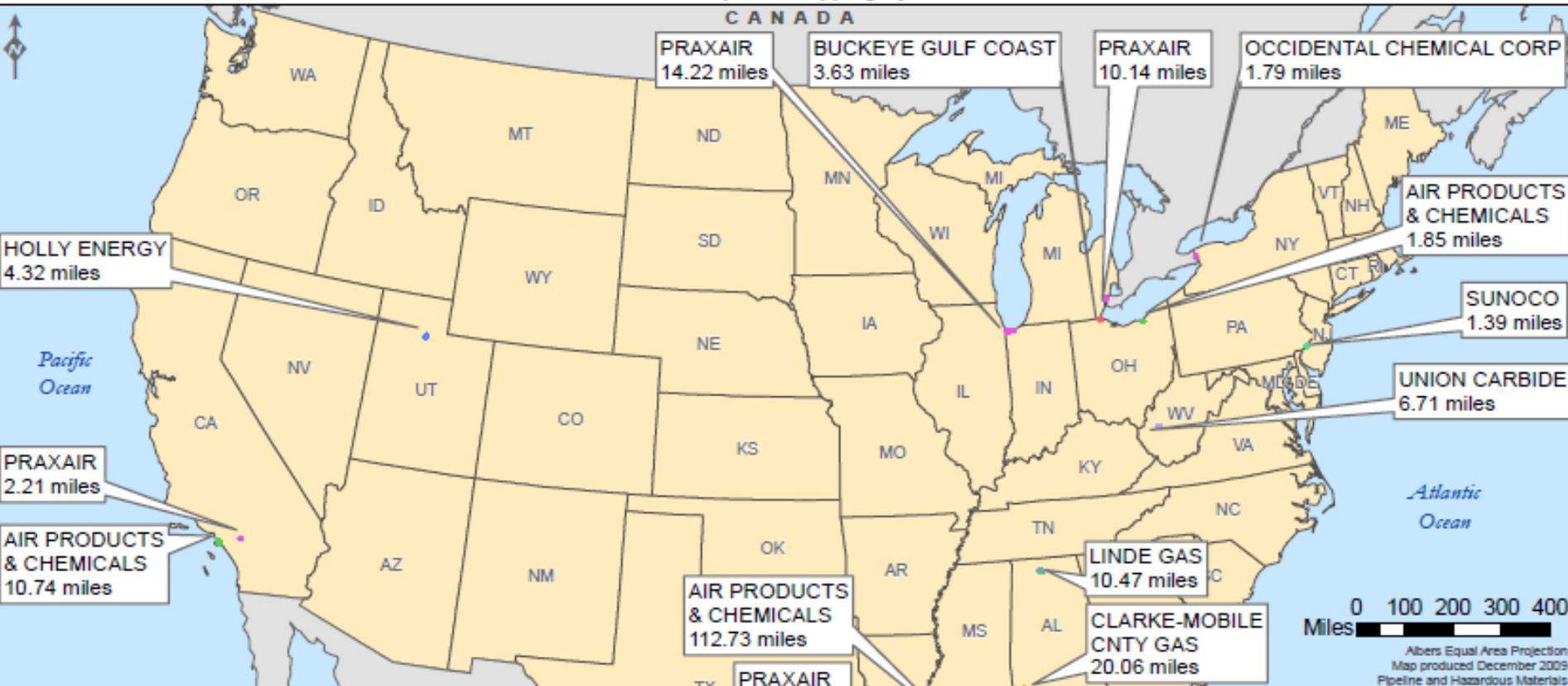
Biogas

- **Production from landfill/dairy waste to biomethane**
 - House/Senate CC Bills proposing mandatory municipal production of landfill biogas
 - Trace constituent integrity & interchangeability guidance needed
 - Concern over odorant effectiveness when introducing biomethane



Hydrogen Gas Pipelines National Pipeline Mapping System

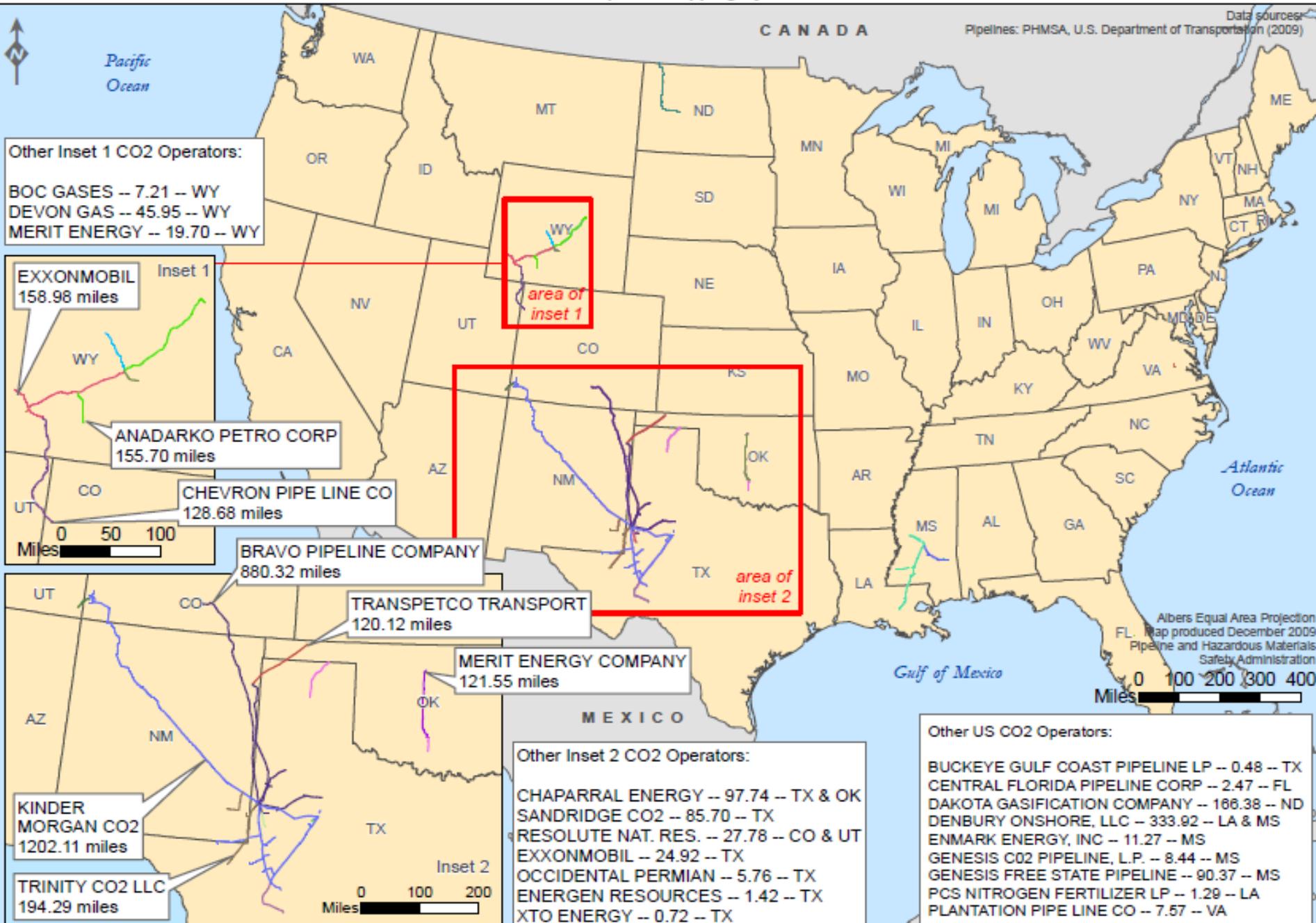
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Hydrogen Pipelines

- **Jurisdictional since 1970 via 49 CFR Part 192**
- **Approximately 22 operators & 2,200 miles currently**
- **Many new systems needed to address the hydrogen economy vision**
- **Integrity Issues:**
 - Induced Cracking/Embrittlement
 - Safe Blowdown
 - Leak Detection Performance
 - First Responders





CO₂ Pipelines

- **Jurisdictional since 1988 via 49 CFR Part 195**
- **Approximately 26 operators & 3,900 miles currently**
- **Many new systems needed to address climate change proposals with transporting from capture to end use**
- **Integrity Issues:**
 - Limited ILI Options
 - Safe Blowdown
 - Leak Detection Performance
 - Valve Spacing & EFRDs
 - First Responders



Protecting Pipelines: Climate Change Next Steps

- **Identify potential impact(s) and impact areas**
 - Above water now, underwater in future
 - New threat areas due to storm surge
 - Change in corrosion grow rates: less/more precipitation
- **Identify adaptation or mitigation actions**
 - New pipeline construction standards?
 - Existing system adaptation standards?
- **Coordinate, collaborate and co-fund actions to remove technical/regulatory barriers and expand stakeholder outreach with solutions**



Thank You!/Questions?

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Gas Star Program

<http://www.epa.gov/gasstar/>