

U.S. Department of Transportation

CO₂ Transportation via Pipeline

Joy O. Kadnar

Pipeline & Hazardous Materials Safety
Administration



Pipeline and Hazardous
Materials Safety Administration

*... safe, reliable, and environmentally sound operation
of the Nation's pipeline transportation system*

Overall Message

- CO₂ pipelines are:
 - Well-established
 - Safe
 - Accident history is on par with other hazardous liquids pipelines
- Existing regulatory environment is satisfactory
- Pipeline operators know the hazards and manage their assets accordingly



Background

- PHMSA
 - Hazardous materials transportation regulator
 - Extensive experience managing the risks of CO₂ in each of its physical states
 - Assures operators manage risk appropriately.
- Hazardous Materials Transportation Laws pertaining to CO₂
 - 49 USC. 5101 et seq. and 49 USC 60101 et seq.
 - HazMat implementing regulations in 49 CFR Parts 171-180
 - Pipeline implementing regulations in 49 CFR Parts 190-199



Regulatory Authority?

- Why does Part 195 apply to CO₂?
 - Properties and characteristics
 - Can cause rapid suffocation
 - May cause nervous system damage, frostbite, dizziness and drowsiness
 - Self-contained breathing apparatus and protective clothing may be required by rescue workers



PHMSA's Pipeline Safety Program

- Oversight shared with authorized state programs
- Other Federal and State agencies jointly make siting and permitting decisions
- 3,468 miles of CO₂ transmission pipelines
- Regional pipeline safety offices
 - # and staffing



Pipeline and Hazardous
Materials Safety Administration

*... safe, reliable, and environmentally sound operation
of the Nation's pipeline transportation system*

What do Regulations Include?

- The hazardous liquid pipeline regulations include requirements for:
 - Pipeline design
 - Construction
 - Mapping
 - Operation and maintenance
 - Qualification of personnel
 - Incident reporting
 - Emergency response
 - Integrity Management



CO₂ Pipeline Infrastructure

- 2007 Annual Reports
 - 3,468 miles
 - \approx 50 billion barrel-miles
 - Midwestern corridor



Pipeline and Hazardous
Materials Safety Administration

*... safe, reliable, and environmentally sound operation
of the Nation's pipeline transportation system*



U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration
Projection: Albers Equal-Area Conic
Map produced March 2009
Source: National Pipeline Mapping System (NPMS), December 2008.

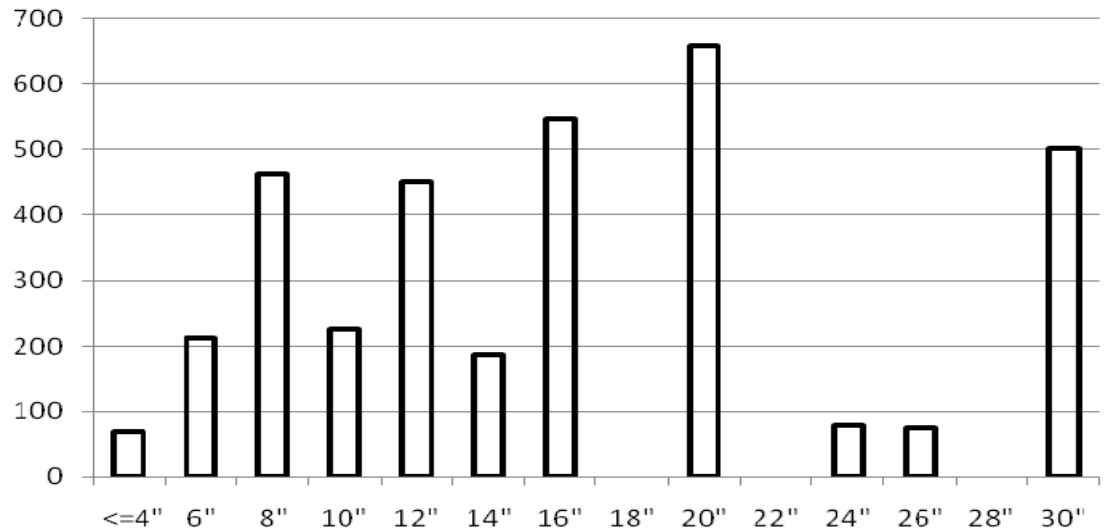
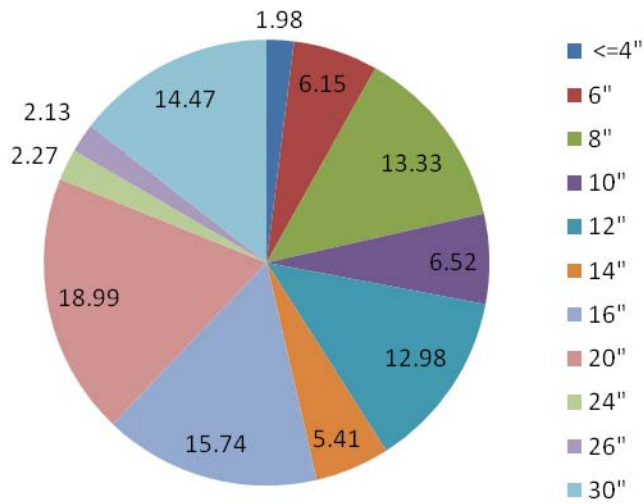
H:\Maps\Joy\National_CO2



**Pipeline and Hazardous
Materials Safety Administration**

*... safe, reliable, and environmentally sound operation
of the Nation's pipeline transportation system*

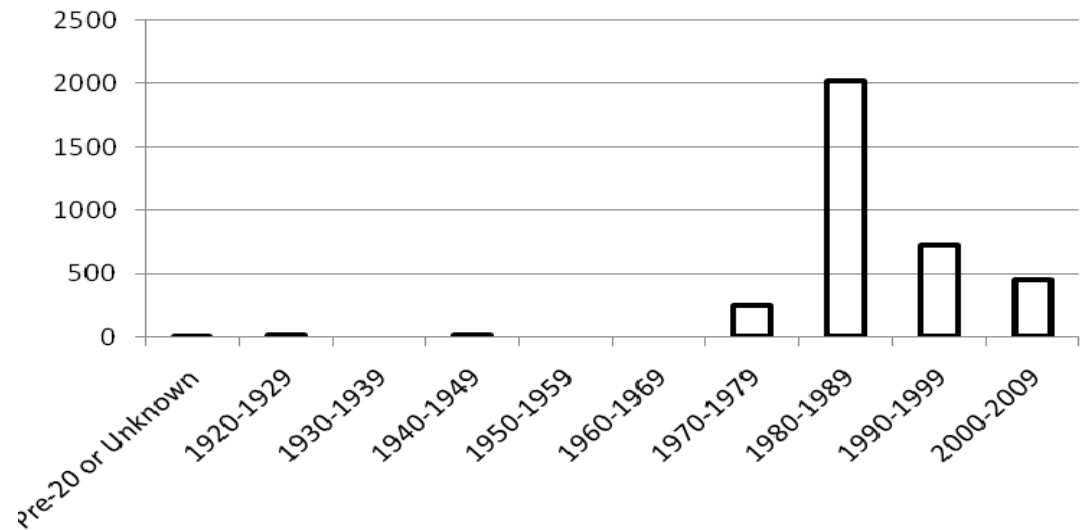
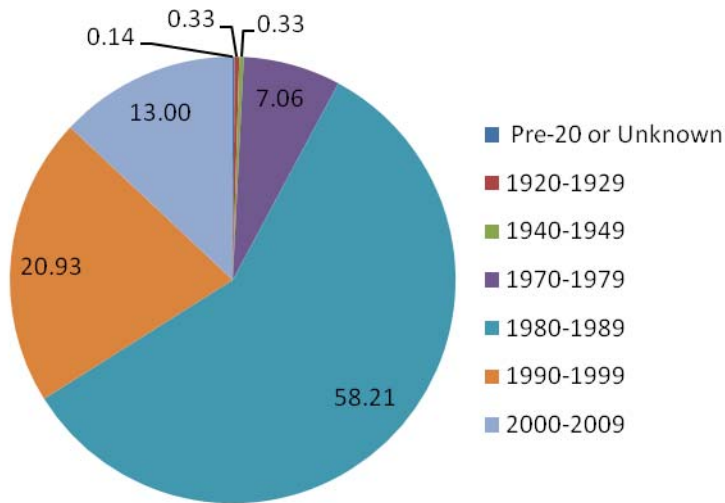
Diameters vs. Mileages



**Pipeline and Hazardous
Materials Safety Administration**

*... safe, reliable, and environmentally sound operation
of the Nation's pipeline transportation system*

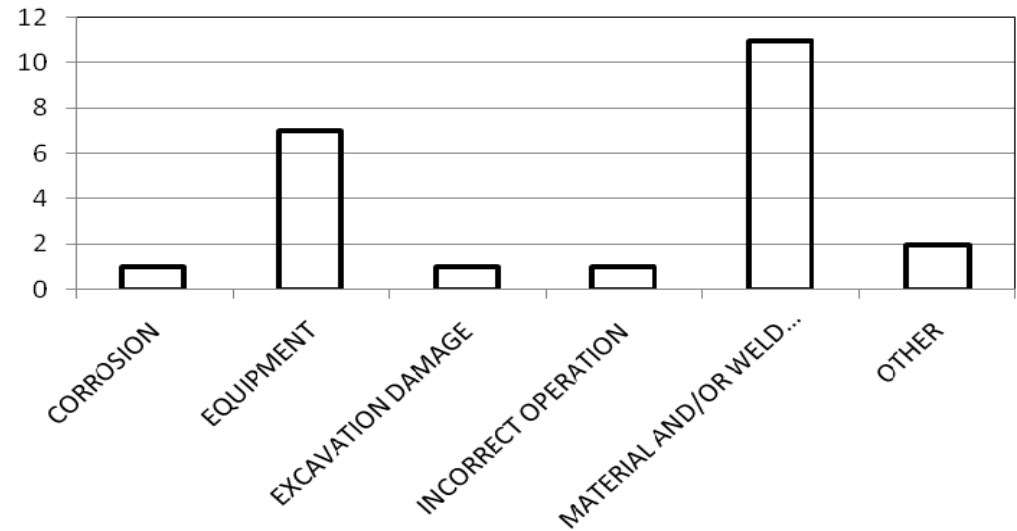
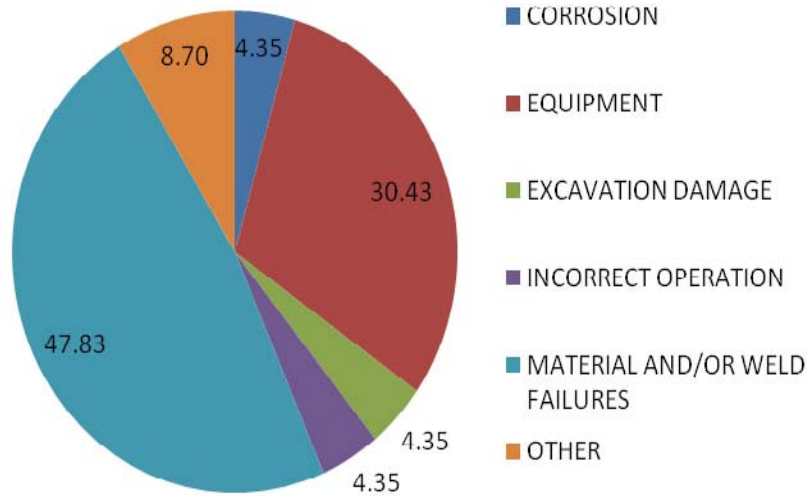
Age of Regulated Assets



**Pipeline and Hazardous
Materials Safety Administration**

*... safe, reliable, and environmentally sound operation
of the Nation's pipeline transportation system*

Failure Causes: 2004-07



**Pipeline and Hazardous
Materials Safety Administration**

*... safe, reliable, and environmentally sound operation
of the Nation's pipeline transportation system*

PEG

- PHMSA established new division
 - We will be looking at CO₂ as well as other pipelines using better data
 - This will provide improved information on risks to enable decisions on:
 - regulations, inspection program and enforcement



Key Entities and Path Forward

- Federal Government—DOE, DOI, DOT and EPA
- States
- NASFM—First responders
- Pipeline siting models
 - CO₂, oil, gas or hybrid?
 - DOT assistance through CATS



Thank you

joy.kadnar@dot.gov



Pipeline and Hazardous
Materials Safety Administration

*... safe, reliable, and environmentally sound operation
of the Nation's pipeline transportation system*

Abbreviations

- USC—United States Codes
- CFR—Code of Federal Regulations
- DOE—Department of Energy
- DOI—Department of Interior
- DOT—Department of Transportation
- EPA—Environmental Protection Agency
- NASFM—National Association of State Fire Marshals
- PEG—Program & Performance Evaluation Group
- CATS—Community Assistance & Technical Services

