



AD ASTRA PER ASPERA  
Kansas

Corporation Commission

**Kansas Corporation  
Commission  
Utilities Division**

*Energy Operations Section of Utilities  
Division*

*Leo Haynos – Chief Engineer*

## KANSAS REGULATED PIPELINE MILEAGE

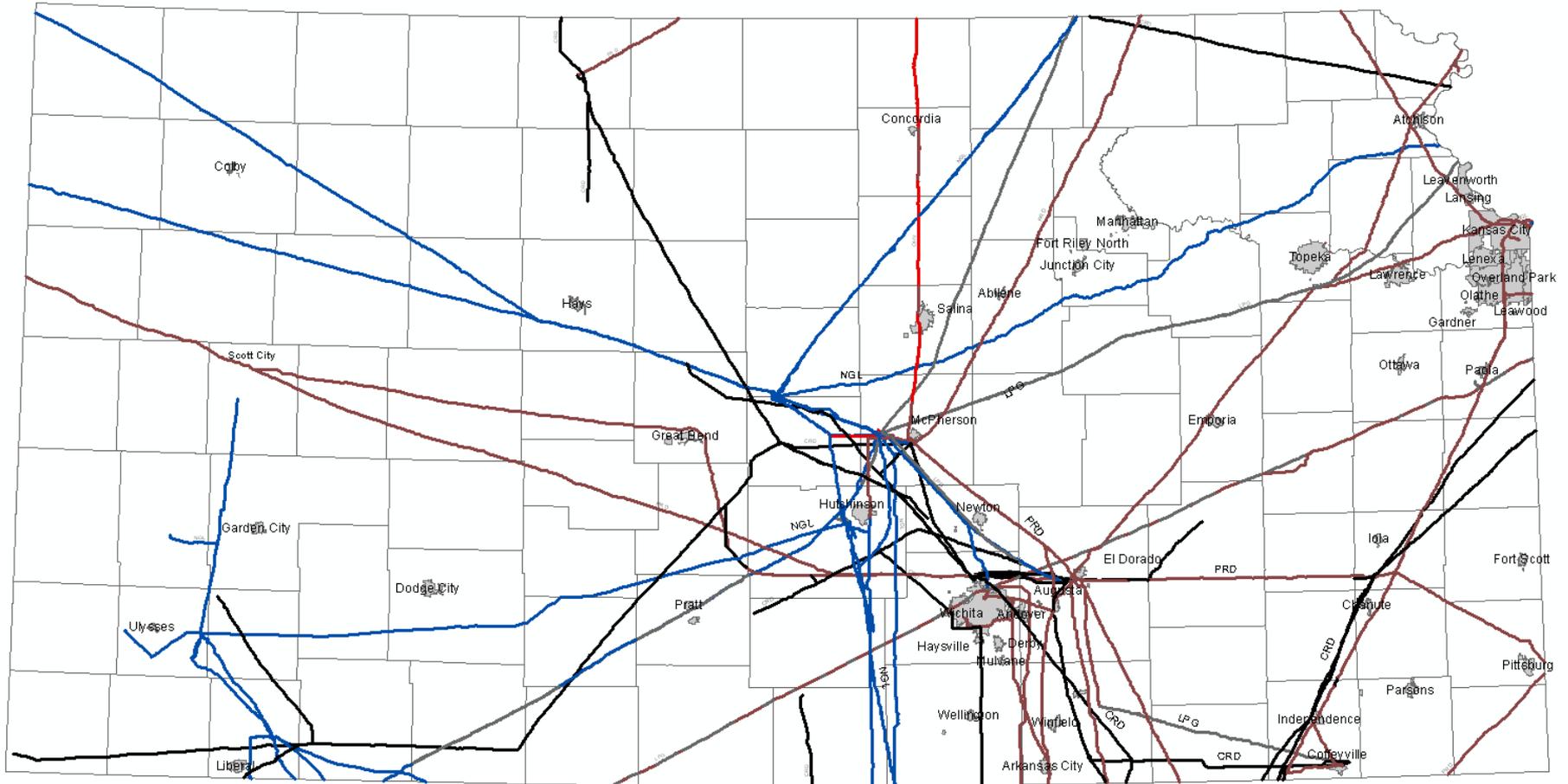
| System Type                               | Detail     | Total Miles   |
|-------------------------------------------|------------|---------------|
| Gas Distribution                          | Mains      | 21,770        |
|                                           | Services   | 11,680        |
| <b>Gas Distribution Total</b>             |            | <b>33,450</b> |
| <b>Jurisdictional Gas Gathering Total</b> |            | <b>17.9</b>   |
| Gas Transmission                          | Interstate | 11,265        |
|                                           | Intrastate | 2,267         |
| <b>Gas Transmission Total</b>             |            | <b>13,532</b> |
| Hazardous Liquids                         | Interstate | 10,998        |
|                                           | Intrastate | 782           |
| <b>Hazardous Liquid Total</b>             |            | <b>11,780</b> |

# Liquid Pipelines

## Federal Jurisdiction

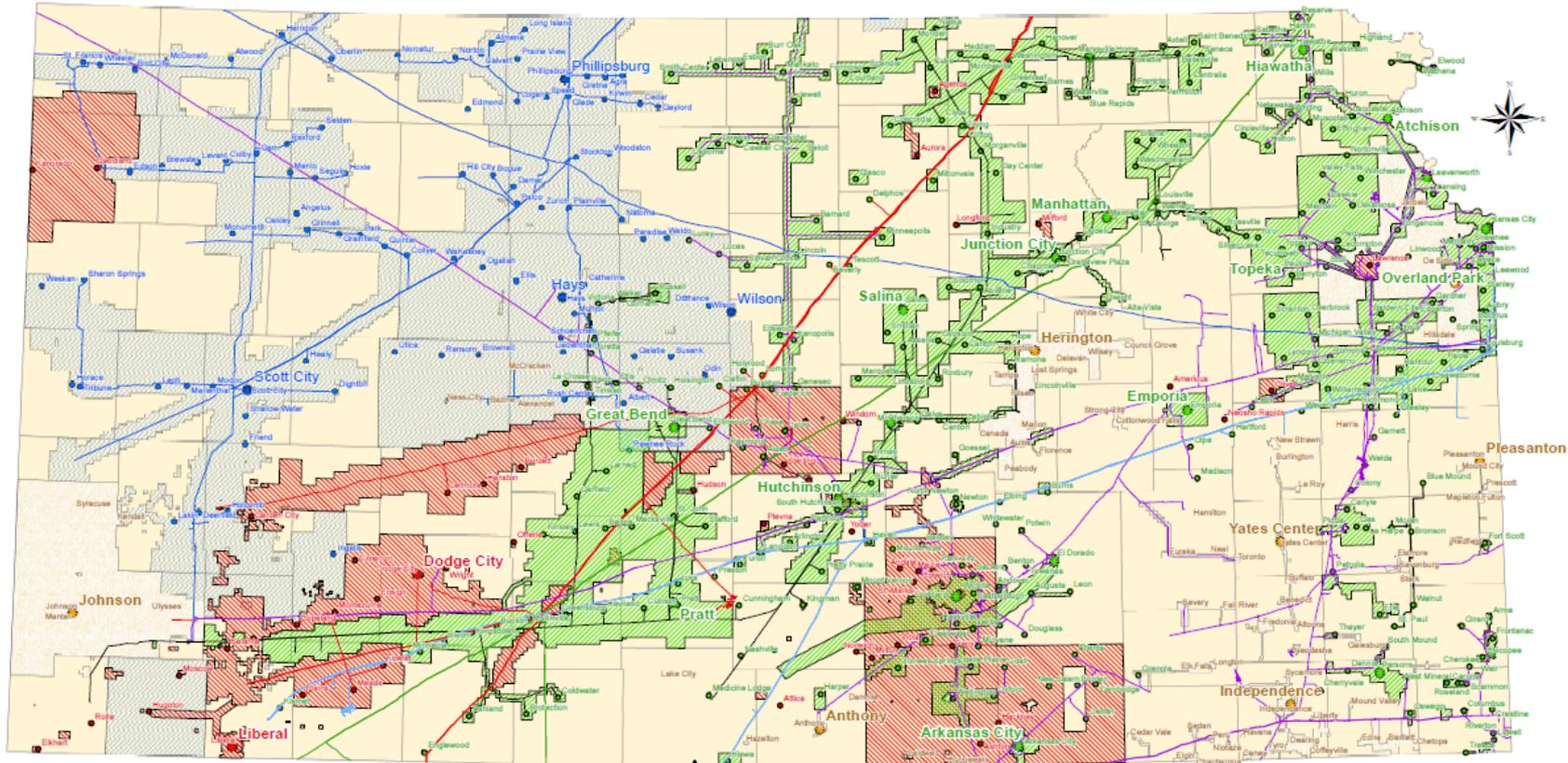
| <b>Commodity</b>                   | <b>Interstate<br/>Miles</b> | <b>Intrastate<br/>Miles</b> | <b>Total Miles</b> |
|------------------------------------|-----------------------------|-----------------------------|--------------------|
| <b>CO2</b>                         | <b>15</b>                   | <b>14</b>                   | <b>29</b>          |
| <b>Crude Oil</b>                   | <b>3,085</b>                | <b>221</b>                  | <b>3,306</b>       |
| <b>Highly Volatile<br/>Liquids</b> | <b>4,557</b>                | <b>523</b>                  | <b>5,080</b>       |
| <b>Refined<br/>Products</b>        | <b>3342</b>                 | <b>24</b>                   | <b>3366</b>        |
| <b>Grand Total</b>                 | <b>10,999</b>               | <b>782</b>                  | <b>11,781</b>      |

# All Crude and Products



- Crude Oil
- Liquid Petroleum Gas
- Natural Gas Liquid
- Other Highly Volatile
- Product

# Kansas Gas Supply

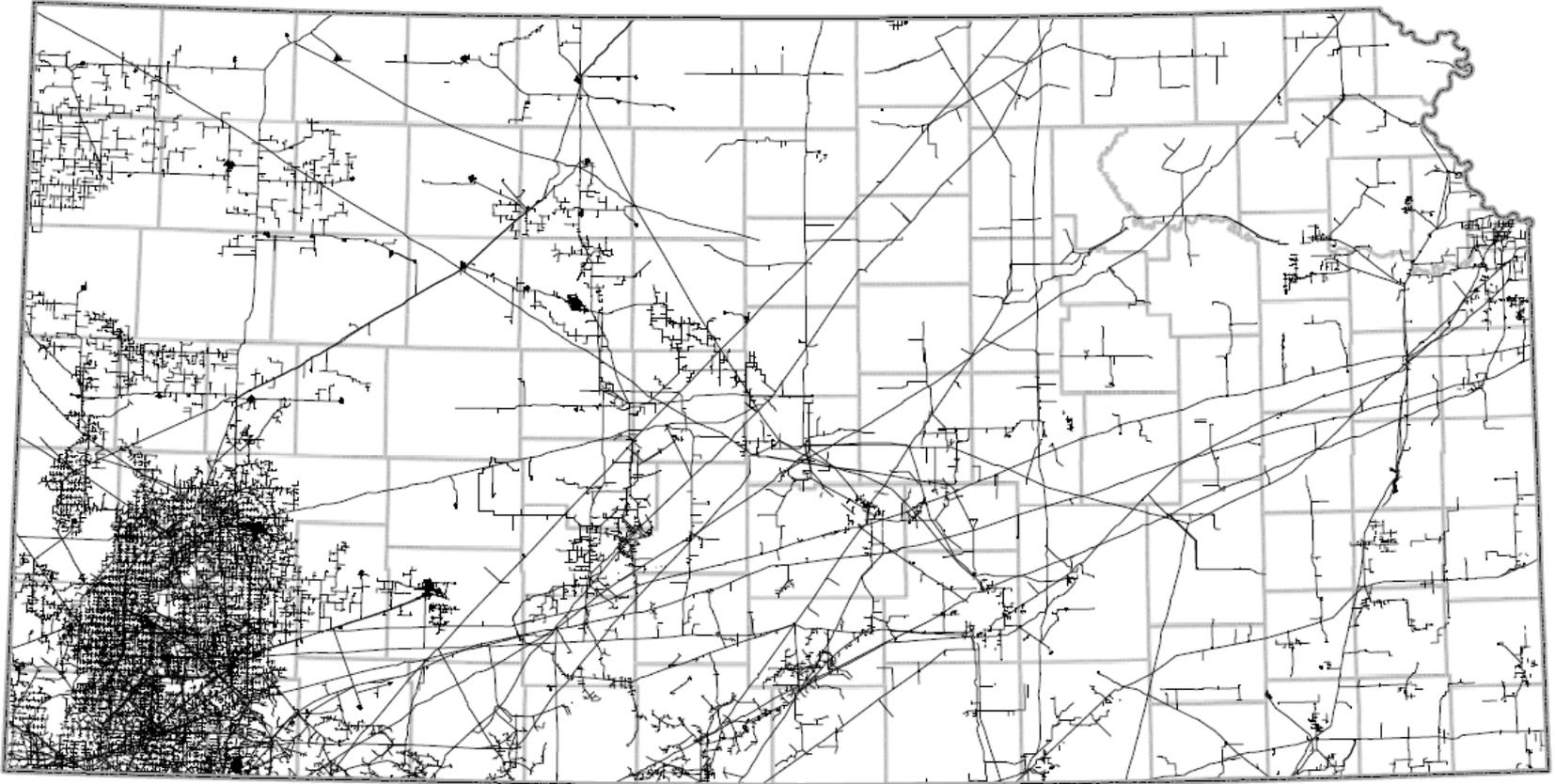


- |                                                         |                                            |                             |                               |
|---------------------------------------------------------|--------------------------------------------|-----------------------------|-------------------------------|
| ANR PIPELINE CO                                         | PANHANDLE EASTERN PIPELINE CO              |                             |                               |
| KANSAS GAS SERVICE COMPANY, A DIVISION OF ONE GAS, INC. | SOUTHERN STAR CENTRAL GAS PIPELINE, INC.   |                             |                               |
| KM FEEDERS, LLC                                         | TALLGRASS INTERSTATE GAS TRANSMISSION, LLC |                             |                               |
| NORTHERN NATURAL GAS CO                                 |                                            |                             |                               |
| KGS Inspection Unit                                     | Black Hills Inspection Unit                | Atmos Inspection Unit       | Midwest Inspection Unit       |
| KGS Service Territory                                   | Black Hills Service Territory              | Atmos Gas Service Territory | Midwest Gas Service Territory |

**State of Kansas  
Gas Supplier System**



# Kansas Natural Gas Pipelines



**Kansas Pipelines**  
— Pipelines

# Pipeline Safety Jurisdiction

- Pipeline Safety authorized by USC 60-105
- Limited to pipelines where product is in “transportation”.
- States agree to adopt federal regulations
- US DOT allowed to fund up to 80% of operating expense
- US DOT annually certifies the states’ enforcement



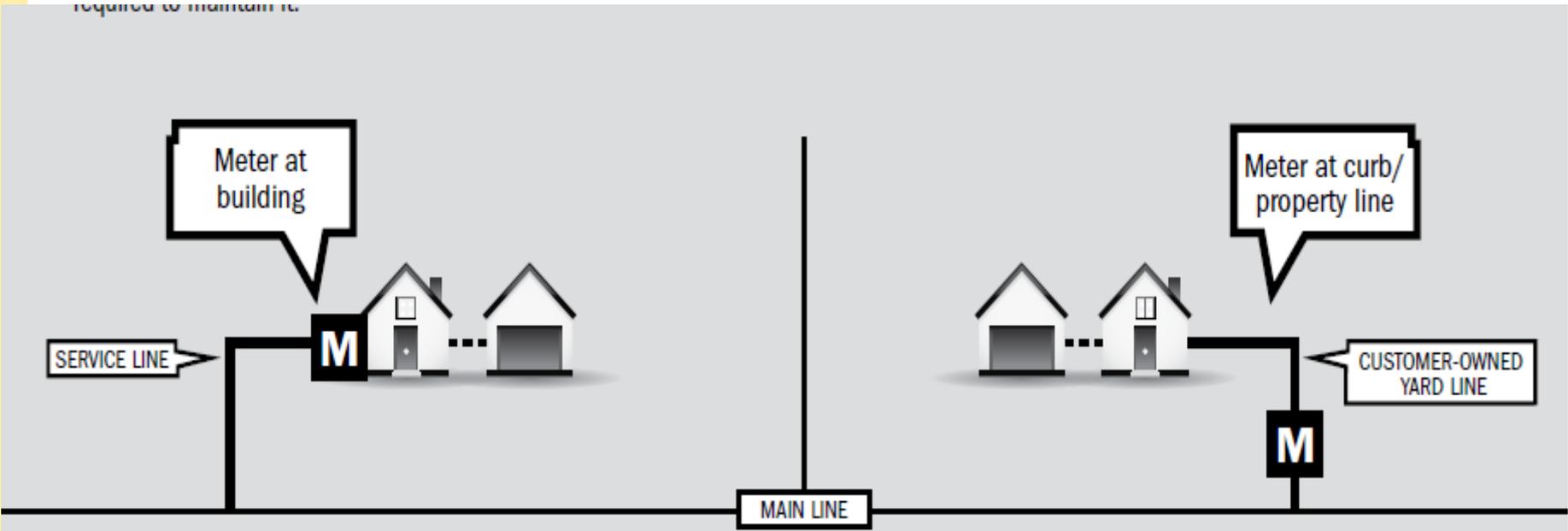
# Jurisdiction



- KSA 66-1,150 adopts federal code
- Jurisdiction over all pipelines that “transport” flammable gas.
- Gathering lines
- Transmission lines
- Distribution piping
- Customer piping from meter to building wall.

# Service Line vs. Yard Line

required to maintain it.



- Maintained by Distribution Company
- - - Maintained by Homeowner



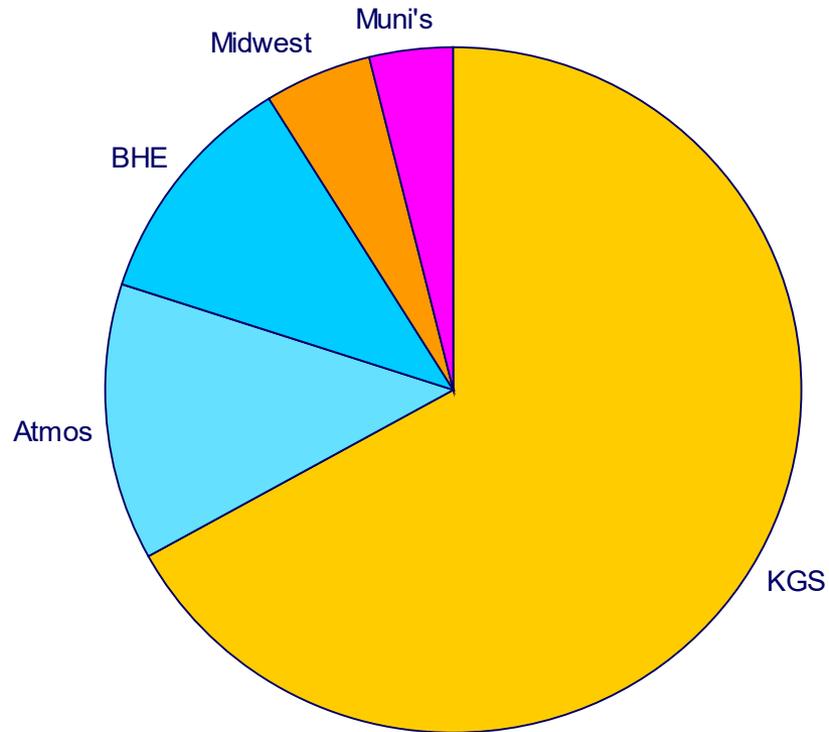
# Statistics



- 977,436 Meters
- 21,770 miles of distribution
- 2,267 miles of transmission
- Annual Inspections
  - 120 Operators
  - 170 Inspection Units
  - 179 Compliance Actions (2021)

# Kansas Operators

## Customer Share





# Pipeline Safety Responsibilities



- Code Compliance
- Incident Investigation

# Code Compliance



- Construction Inspections
- Operating Procedures
- Maintenance Procedures
- Emergency Response

# Incident Investigation

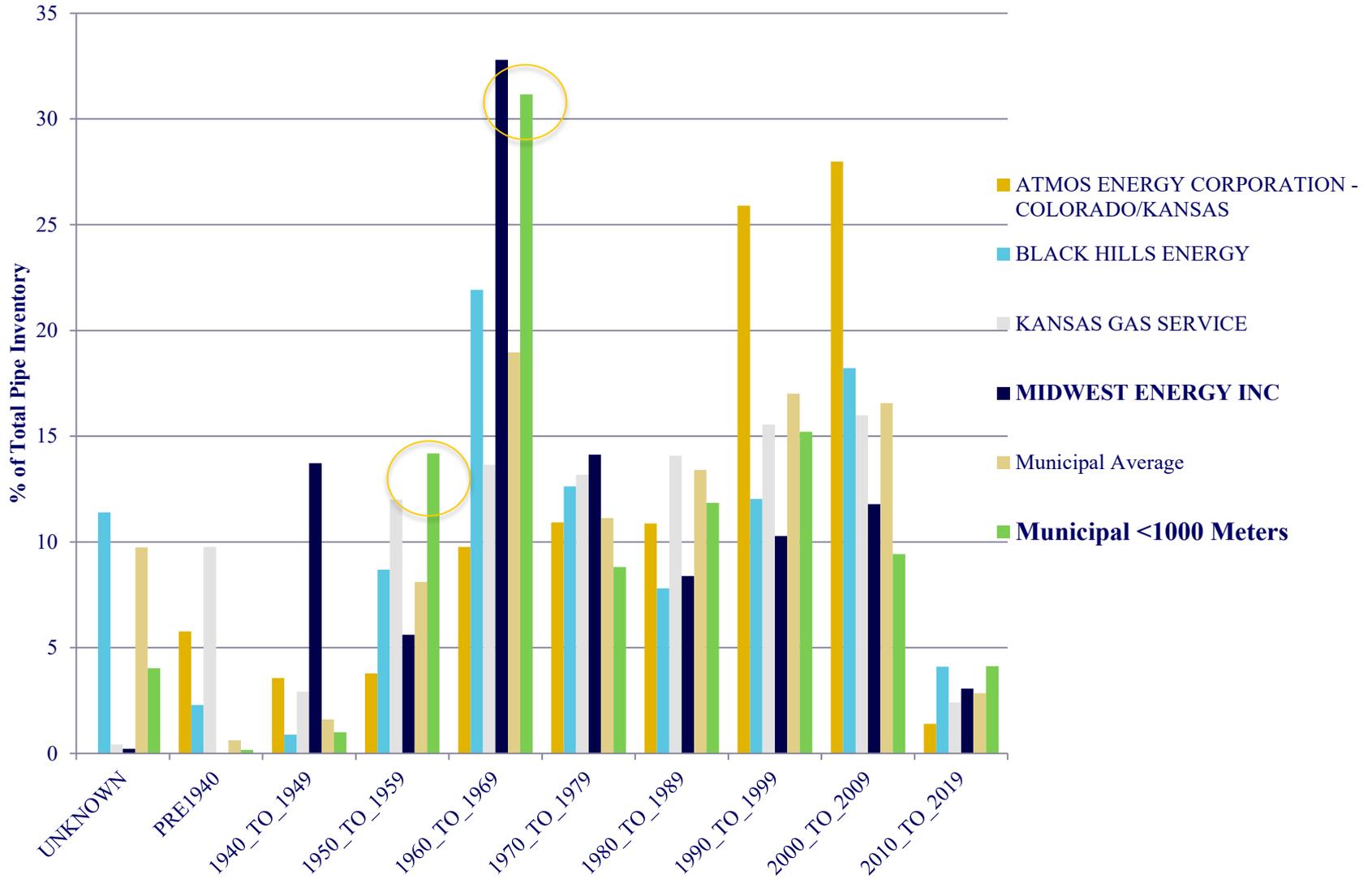


- What happened
- Was incident related to jurisdictional piping
- Code violations
- Corrective Actions

# **Overview of Aging Natural Gas Infrastructure in Kansas**

% of **Main** by Decade Installed

# At Risk by Age of Infrastructure



# Age of Pipe vs. Fit for Service

- No direct correlation between age of pipe and risk.
- Cumulative leaks from corrosion for pipe remaining in service better indication of pipe's fitness for service.
- Corrosion is time dependent – all steel corrodes.
- Leak data may indicate time to take action.
- Response to Leak data not proactive.

# Steel Pipe Corrosion



# Customer Owned Piping serving school



# Customer Owned Piping serving school



# Rate of Pipe Replacement



1/24/2023

Kansas Corporation Commission



AD ASTRA PER ASPERA  
**Kansas**



Corporation Commission

**Kansas Underground  
Utility  
Damage Prevention  
Act  
(KUUDPA)**

# KUUDPA Jurisdiction



- All Excavators
- Utility operators
  - Telephone
  - Cable TV
  - Electric
  - Gas
  - Hazardous Liquids
  - Water & Sewer

# KUUDPA 2022 Statistics



- 658,000 Locate Requests by excavators includes:
  - 188,000 updates of original request
  - 15,500 alleged Non-Response from locator.
  - 38,700 emergency requests
- 3.6 million actions taken by operators.
  - Providing locates
  - Responding that site is clear

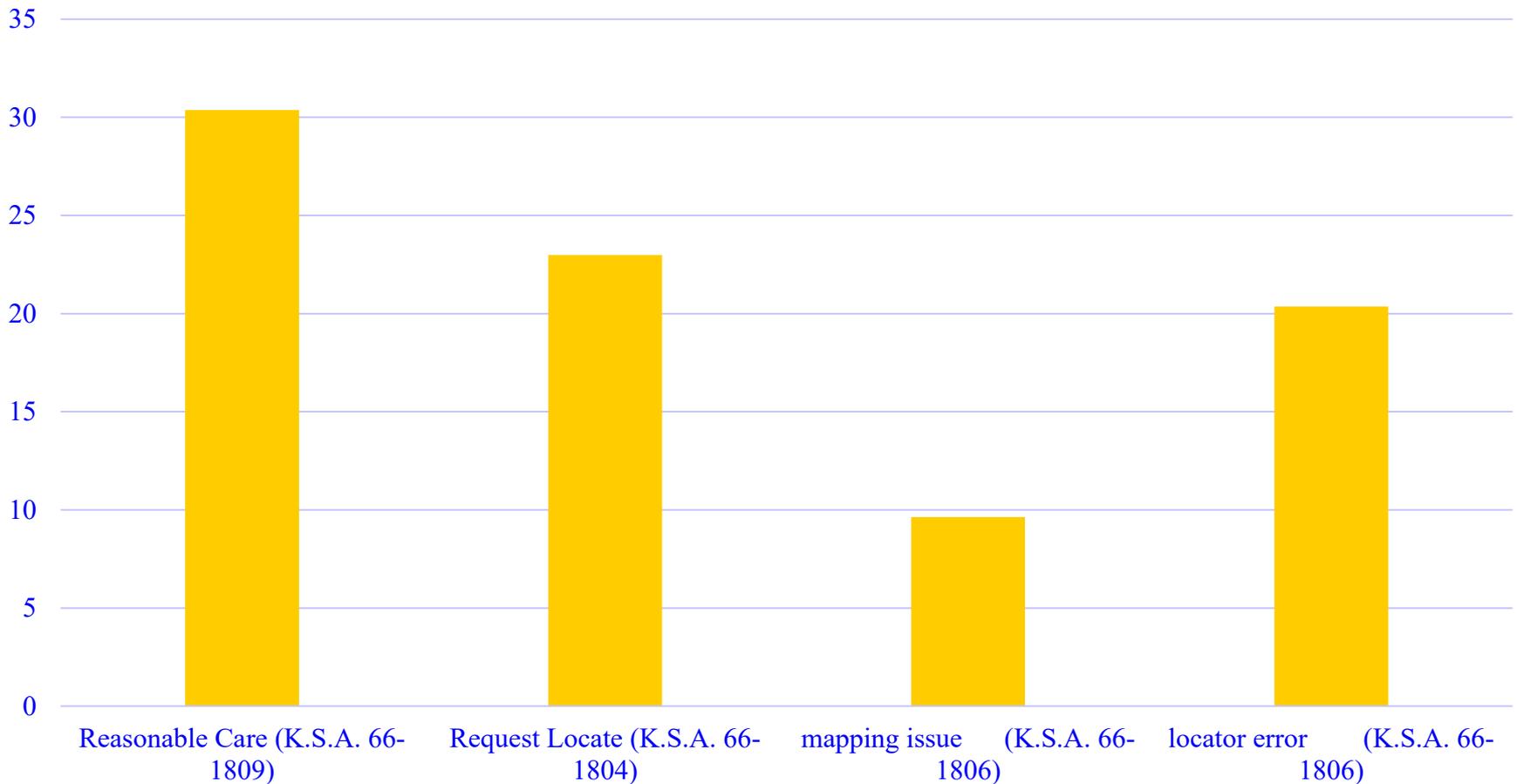
# KCC Enforcement



- Complaint Driven
- JO and SG County Investigators
  - 95% funding by PHMSA
  - Responds to damages
  - Writes Notices of Probable Violation
  - Recommends penalty orders
  - Random inspections of locates

# Root Cause of Kansas Damages 2021 (CGA DIRT Report)

2021 Utility Damages in Kansas  
Root Cause (%)



# KCC Penalties Related to KUUDPA 2021

Staff took 536 Compliance actions resulting in warning letters or recommendations for penalty.

Commission approved 20 penalties for violation of KUUDPA for total \$10,000

- 10 issued to excavators
- 10 issued to operators
- Commission staff recommended \$147,000 in penalties in docket 21-KSGS-398-SHO
  - awaiting results from operator program improvement before taking final action.

# Related Gas Safety Issues



- Excavation leading cause of Natural gas incidents in nation.
- Boring through sewers
- Mapping errors
- Ignored customer piping
- Depths of burial



MAY 10 2004



# Hydrogen Gas Pipelines and Hydrogen Blending



*Association of Pipeline Safety Representatives*

*Office of Pipeline Safety*



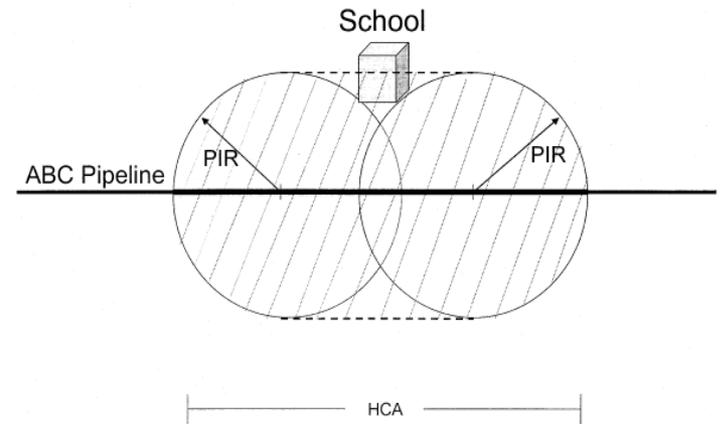
U.S. Department of Transportation  
Pipeline and Hazardous Materials  
Safety Administration

To Protect People and the Environment From the Risks of  
Hazardous Materials Transportation



# Hydrogen 101 Facts

- *Hydrogen is the smallest and most abundant element (gas molecule: H<sub>2</sub>).*
- *Odorless, colorless, tasteless like natural gas, but odorant would need to be light enough to travel with it and disperse with it – mercaptans based odorants unlikely to be effective.*
- *Explosive Limits:*
  - H<sub>2</sub> = 4% to 77% in air
  - NG = 5% to 15% in air
- *Gross Heating Values*
  - H<sub>2</sub> = 325 BTU/ft<sup>3</sup>
  - NG = 1050 BTU/ft<sup>3</sup>
- **Potential Impact Radius (PIR):**
  - PIR for H<sub>2</sub>:  $r = \underline{0.47} \sqrt{(pd^2)}$
  - PIR for NG:  $r = \underline{0.69} \sqrt{(pd^2)}$



# Pipeline Integrity, Unique Concerns

**Hydrogen Involved Failure Mechanisms** – Steel and welds may be prone to hydrogen embrittlement.

**New Pipe Materials** – Composites, high strength polymers, aluminum alloys, stainless steels

**Joining** – New pipe materials could lead to joint design and integrity concerns.

**Leakage** – May differ for transmission and distribution of natural gas.

**Leak Detection** – Technologies differ from natural gas.

**Odorization** – Needs for odorant may differ from natural gas, and between transmission and distribution.

**In-line Inspection and other assessment technologies** – Research and development being conducted

**Pipeline Repair** – Safety concerns and effects of hydrogen on repair methods being evaluated

**Compressor Stations** – Physical differences for pure H<sub>2</sub> gas and for different blends.

**Hydrogen blended in natural gas** – Meter accuracy; Plumbing/Appliance safety, Interchangeability; Differences by blend ratios.



# PHMSA Hydrogen & Emerging Fuels From 2021 Workshop and R&D Forum

## Research Gap Areas Deemed Priority

1. Technology Development – Solutions for Predicting/Monitoring Hydrogen Gas Loss
2. General Knowledge – Review of Integrity Threat Characterization Resulting from Hydrogen Gas Pipeline Service
3. Technology Development – Advancing Hydrogen Gas Leak Detection Tools when Blended with Natural Gas Pipeline Operations.
4. General Knowledge – Determining the Required Modifications to Safely Repurpose Existing Pipelines to Transport Blended & Pure Hydrogen
5. Technology Development – Validate Existing or Develop New Hydrogen Leak Detection Sensors Compatible with Hydrogen-Natural Gas Blends



# Key Takeaways

- More research and information needed to grasp the pipeline safety concerns with hydrogen blending on existing systems.
- There are a multitude of projects and pilot programs happening currently.
  - Not sure when the data will be available for review.
- Uncertain if/when distribution pipelines will see widespread adoption of hydrogen blending. It will vary by State dependent upon local regulations and requirements.



# Questions?

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