

# PHMSA Pipeline Class Location Methodology Workshop

Wednesday April 16, 2014

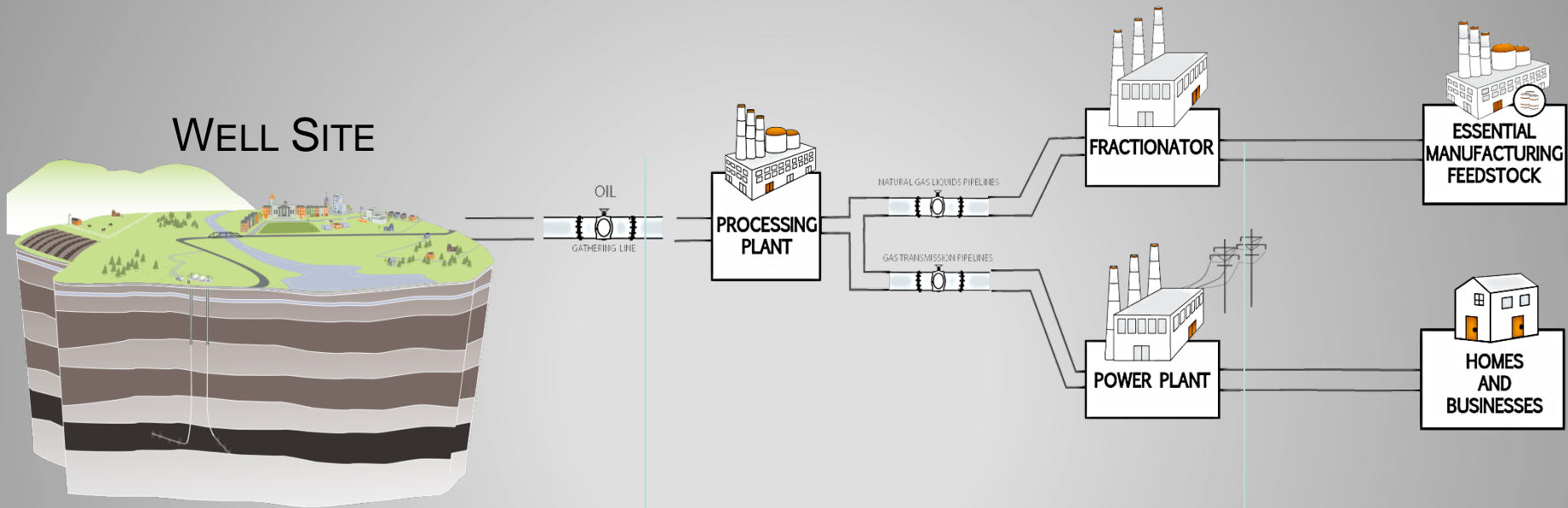
Crystal City Hilton

Arlington, VA



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# Phases of Natural Gas Transportation



**“UPSTREAM”**  
EXPLORATION AND  
PRODUCTION

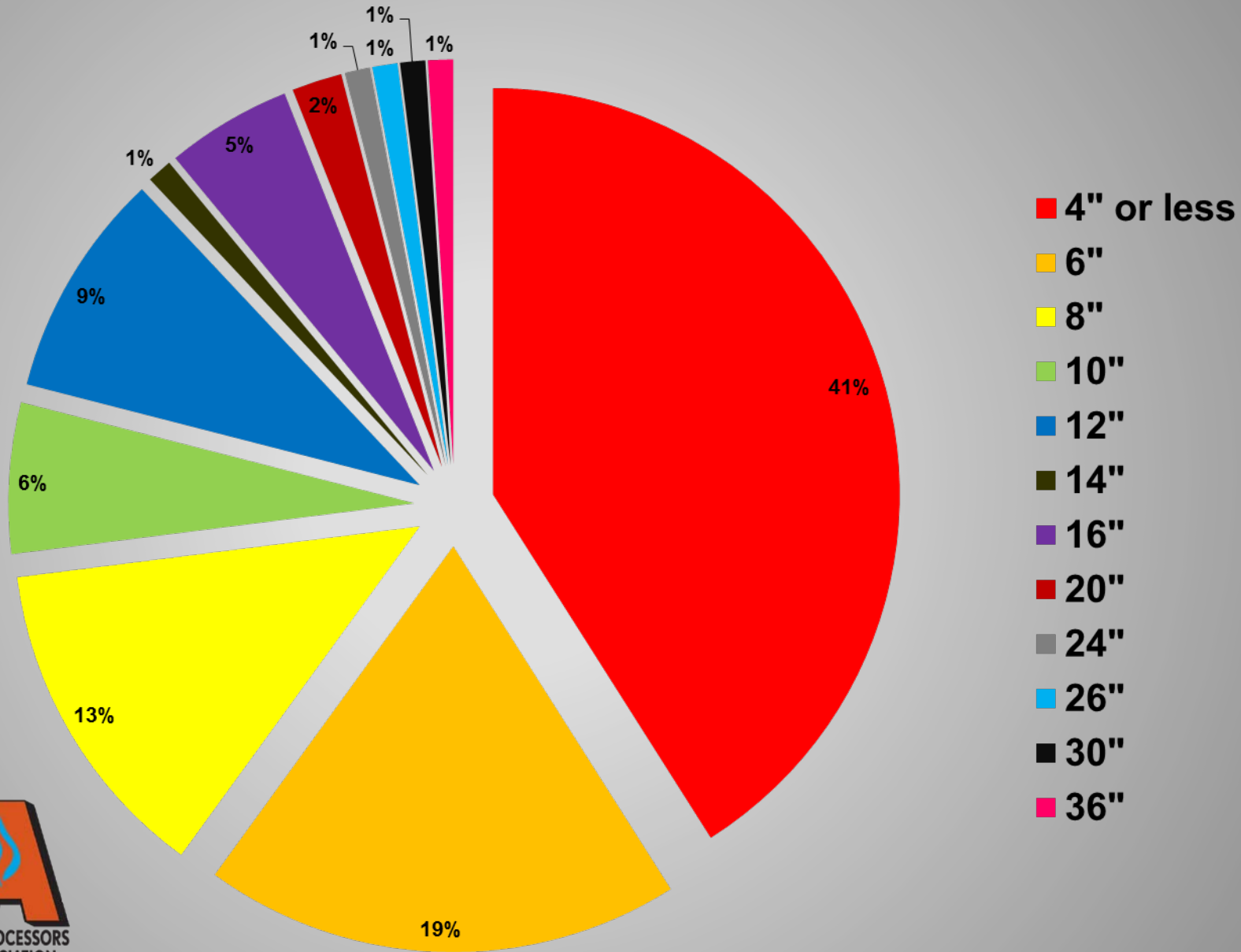
**“MIDSTREAM”**  
GATHERING, PROCESSING,  
TREATING, COMPRESSING

**“DOWNSTREAM”**  
TRANSMISSION &  
DISTRIBUTION



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# Gathering Pipe by Reported Diameter in Class 1



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\* 45 Companies reported 132,586 miles

# What requirements apply to onshore gathering lines?

- Must comply with requirements applicable to transmission lines
- Except instrumented, internal inspection devices and integrity management



# Class Locations Based on Population Density



## Class Location:

- Establishes population density around a “sliding” mile of pipeline
- The denser the population, the more stringent the safety requirements

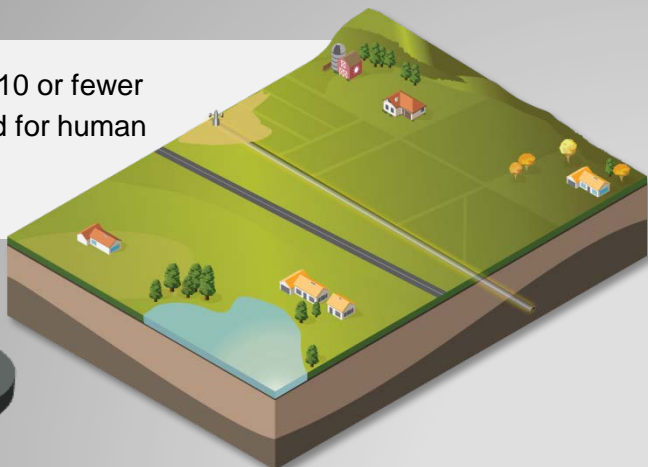


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# Higher Class Location Units = More Stringent Regulations

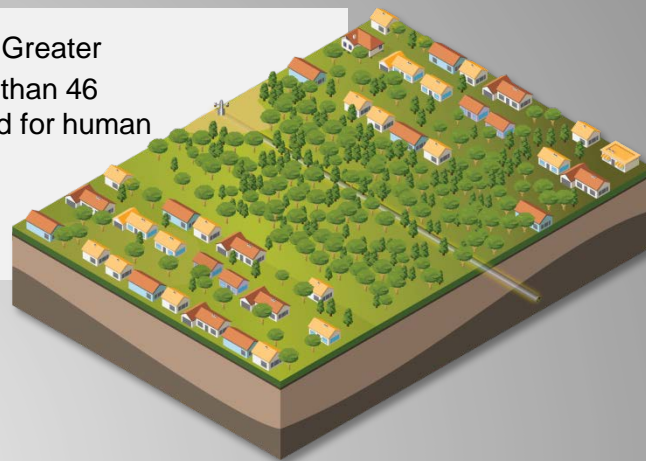
**Class 1** = 10 or fewer buildings intended for human occupancy.

72% DESIGN



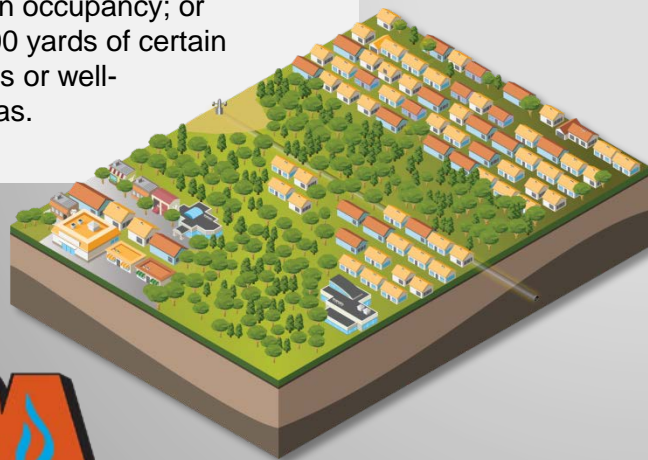
**Class 2** = Greater than 10 but fewer than 46 buildings intended for human occupancy.

60% DESIGN



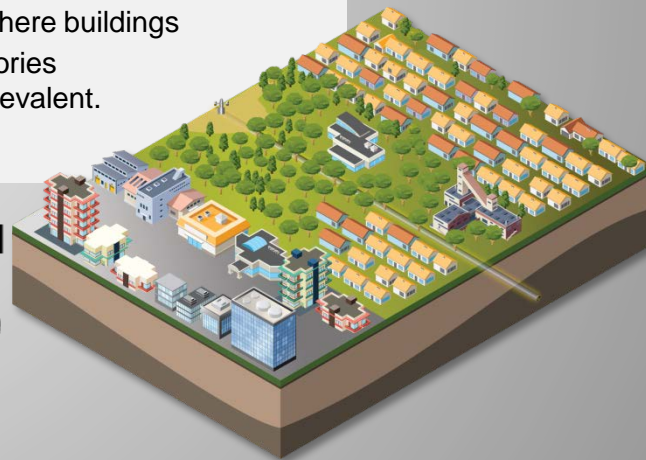
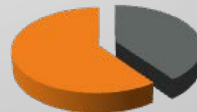
**Class 3** = 46 or more buildings intended for human occupancy; or locations within 100 yards of certain populated buildings or well-defined public areas.

50% DESIGN



**Class 4** = Where buildings with four or more stories aboveground are prevalent.

40% DESIGN



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# What about Pipeline Pressures?

## Design Pressure Formula for Steel Pipe (192.105)

$$P=(2 St/D) \times F \times \cancel{E} \times \cancel{T}$$

$P$  = Design pressure in pounds per square inch

$S$  = SMYS in pounds per square inch

$D$  = Nominal outside diameter of the pipe, inches

$t$  = Nominal wall thickness of the pipe in inches

$F$  = Design safety factor



**Class**

**Location**

**Design**

**Factor:**

Class 1= 72%

Class 2= 60%

Class 3= 50%

Class 4= 40%



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# Key Areas in 192 Affected By Class Location

- Design Pressure
- Establishing MAOP (Design & Testing)
- Jurisdiction of Gathering Lines
- Construction
- Compressor Station Design & Testing
- Valve Spacing





# Key Areas Continued...

- Selection of Media for Testing Pipelines
- Effects of Class Location Change
- Odorization
- Patrol Frequency
- Leak Survey Frequency
- Line Marker Placement
- Depth of Cover Requirements
- Integrity Management (HCAs)



# Advantages of Using Class Location

- Consistency
- Familiarity
- Addresses Risk to People
- Demonstrates Compliance
- Cost Benefit

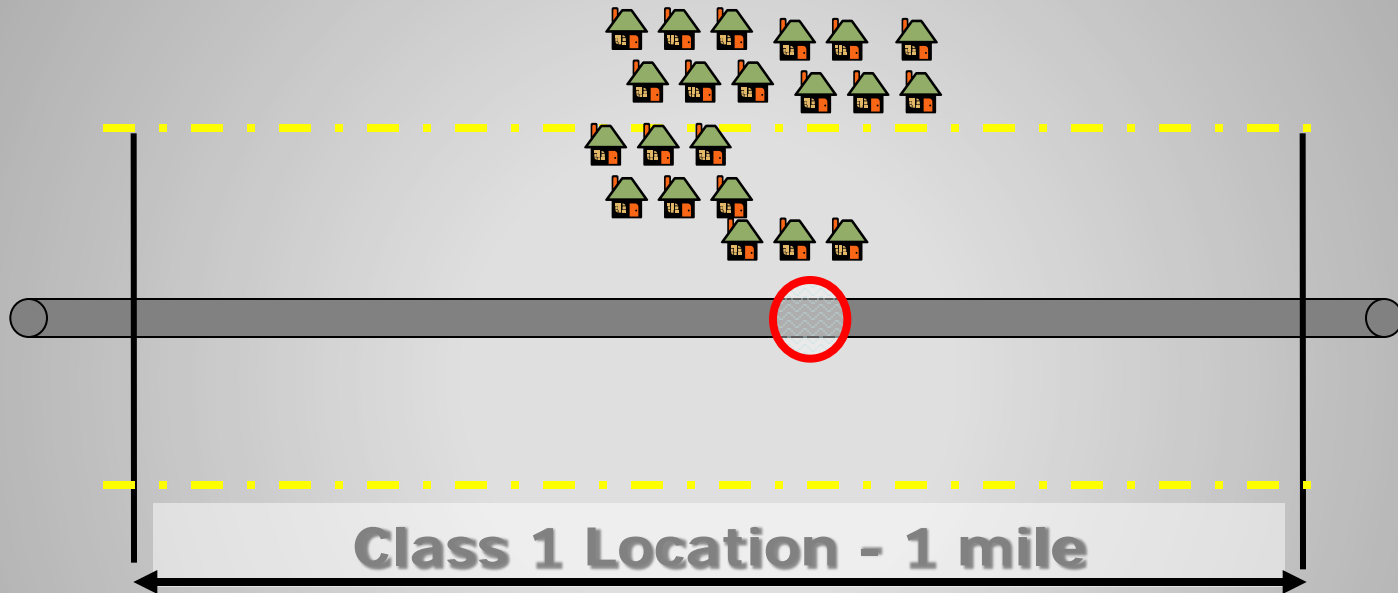




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# 660' vs. PIR

Size: 4"; PSI: 1200



## PIR Formula

Class 1 Pipeline

Pipeline MAOP = 1200 psi &  
Nominal Diameter = 4 Inches

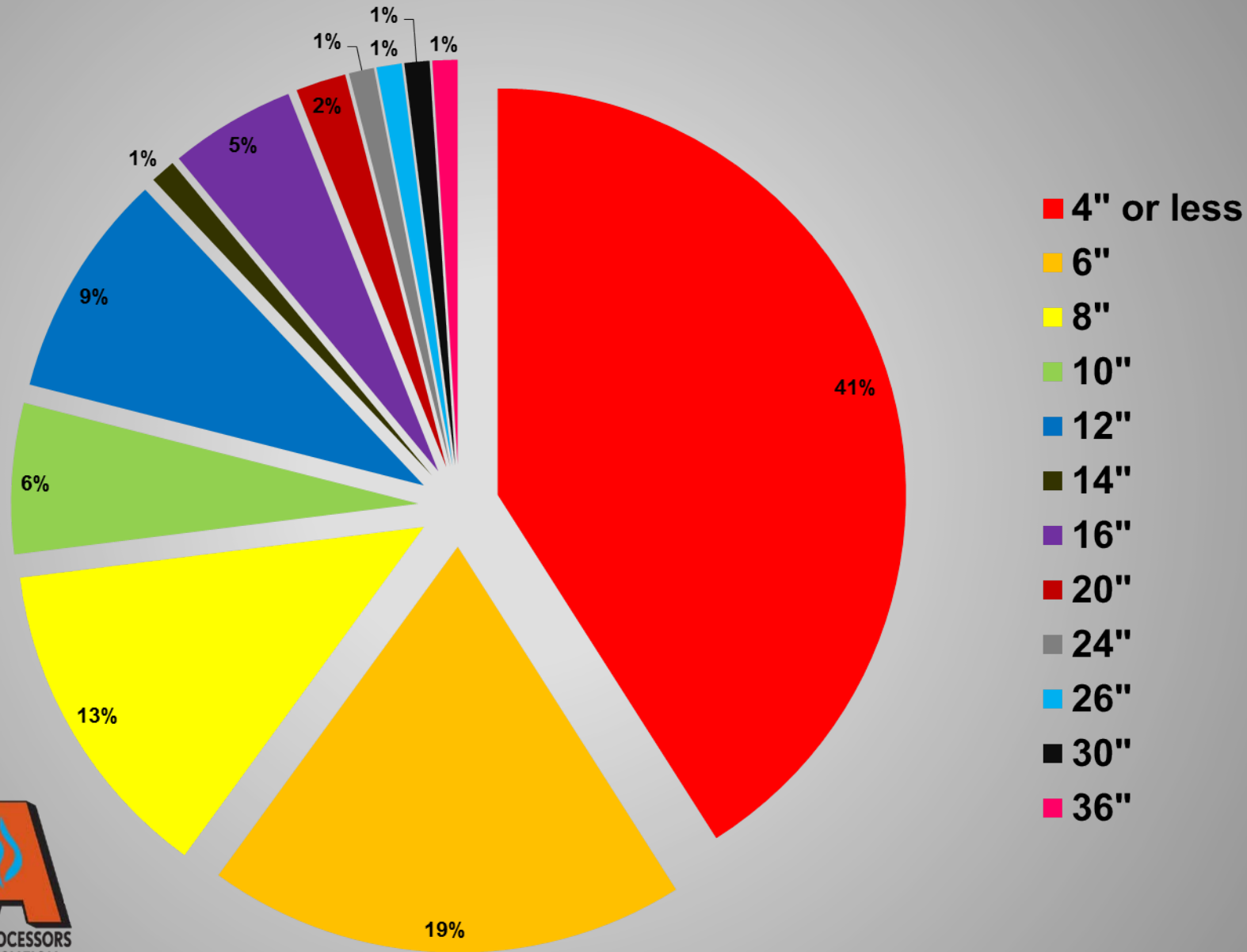
$$PIR = 0.69\sqrt{pd^2} = 108 \text{ Feet}$$

## Legend

--- 660' Buffer

○ PIR

# Gathering Pipe by Reported Diameter in Class 1

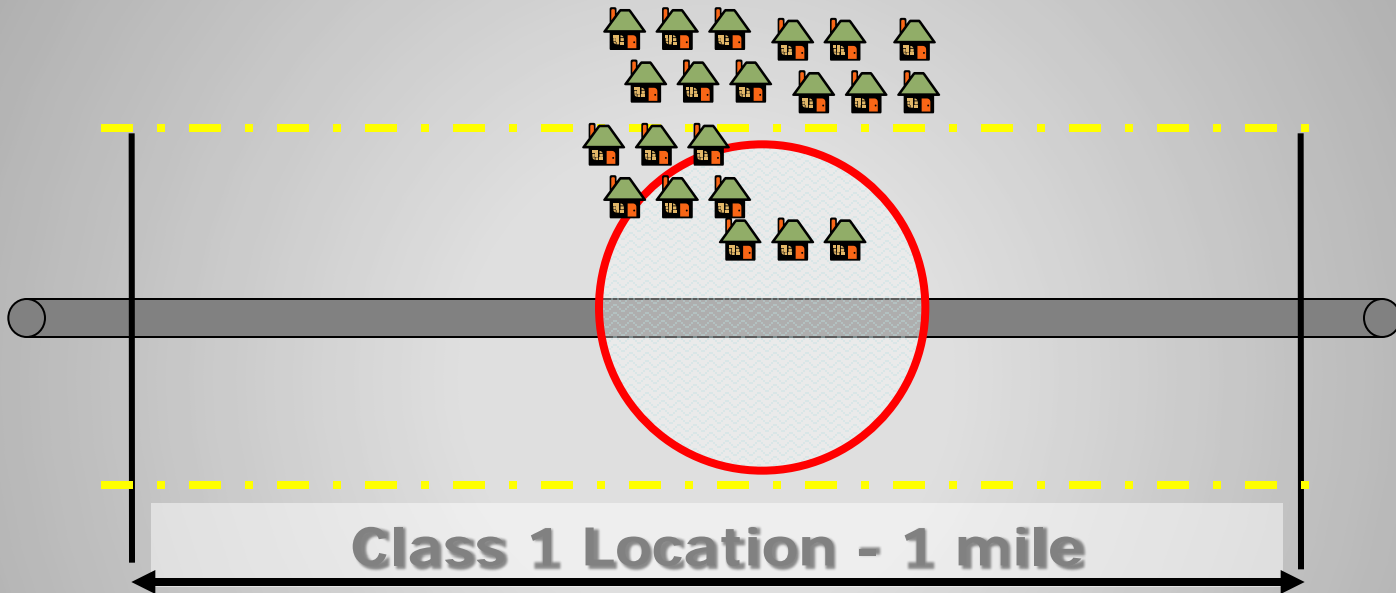


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# 660' vs. PIR

Size: 24"; PSI: 1200



## PIR Formula

Class 1 Pipeline

Pipeline MAOP = 1200 psi &  
Nominal Diameter = 24 Inches

$$PIR = 0.69\sqrt{pd^2} = 574 \text{ Feet}$$

## Legend

--- 660' Buffer

○ PIR

# In Conclusion

- We believe class location methodology should be retained, especially for pipelines presently in service.
- If PIR concept is adopted going forward, operators should have a choice.
- Maintenance inspection requirements and intervals should be appropriate for both class location and PIR concepts.



QA



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