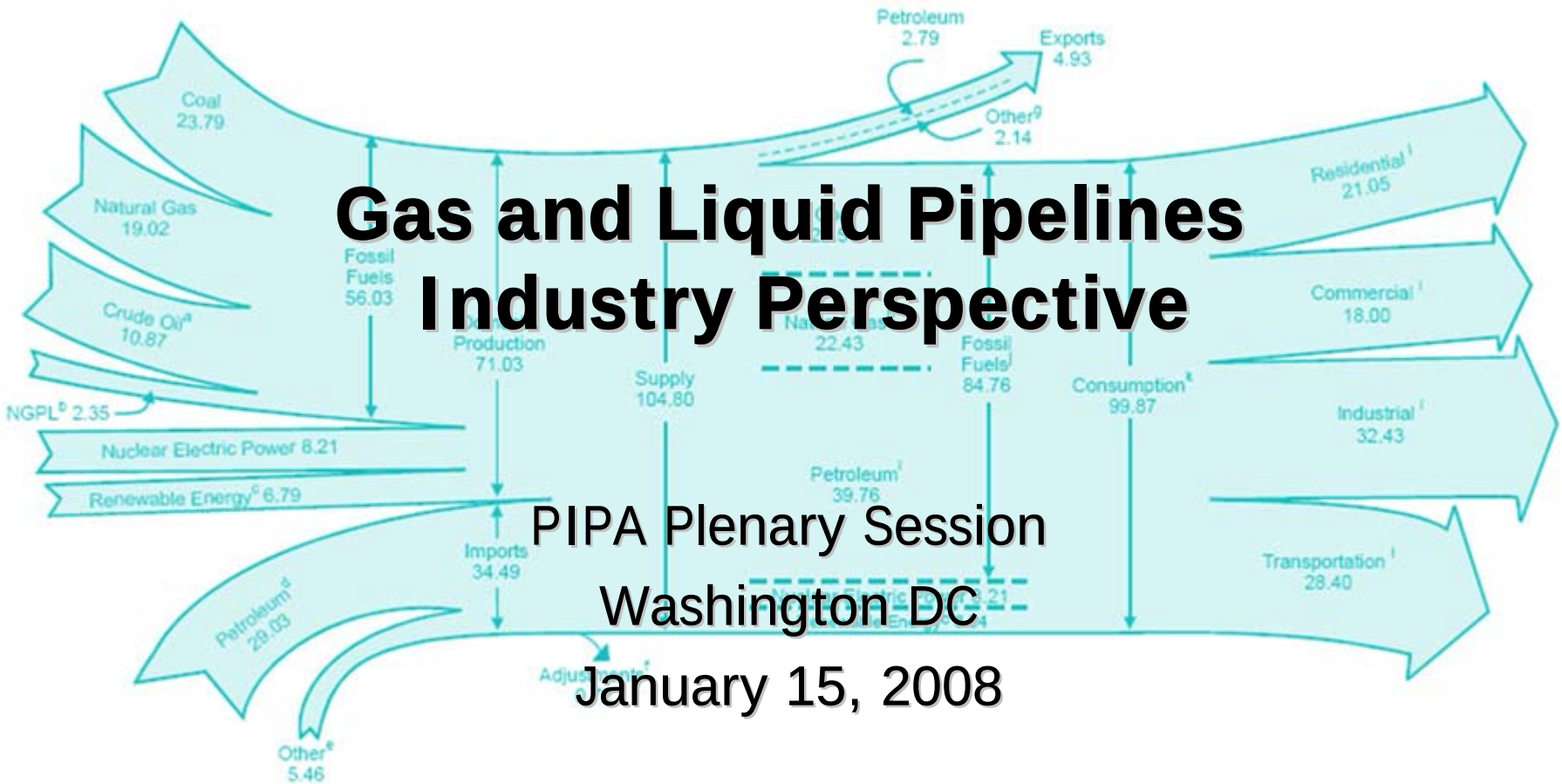

Gas and Liquid Pipelines Industry Perspective

PIPA Plenary Session

Washington DC

January 15, 2008

Agenda

1. **Introduction to Gas and Oil Pipelines**
   - Benefits, Network, Characteristics, Challenges, Regulatory Framework

2. **Rights-of-Way**
   - Specification
   - Acquisition
   - Development
   - Maintenance

3. **Pipeline Integrity Management (IM)**
   - IM Principles
   - Gas IM
   - Liquid IM

4. **Pipeline Economics**

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Agenda

1. **Introduction to Oil and Gas Pipelines**

   - Benefits, Network, Characteristics, Challenges, Regulatory Framework

Oil Benefits

Energy

- **Heating**
  - Home heating oil
  - Propane
- **Fuels**
  - Automotive
  - Aviation
  - Railroads
  - Ships and barges
  - Power plants
  - Military bases

Raw materials

- Pharmaceuticals
- Plastics
- Cosmetics
- Fertilizers
- Construction materials

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What Oil Pipelines Do

Transport flammable, hazardous, useful products to customers under strict federal and state requirements through towns, cities, neighborhoods, and cross country where people live, work and play.

We MUST do it safely and reliably

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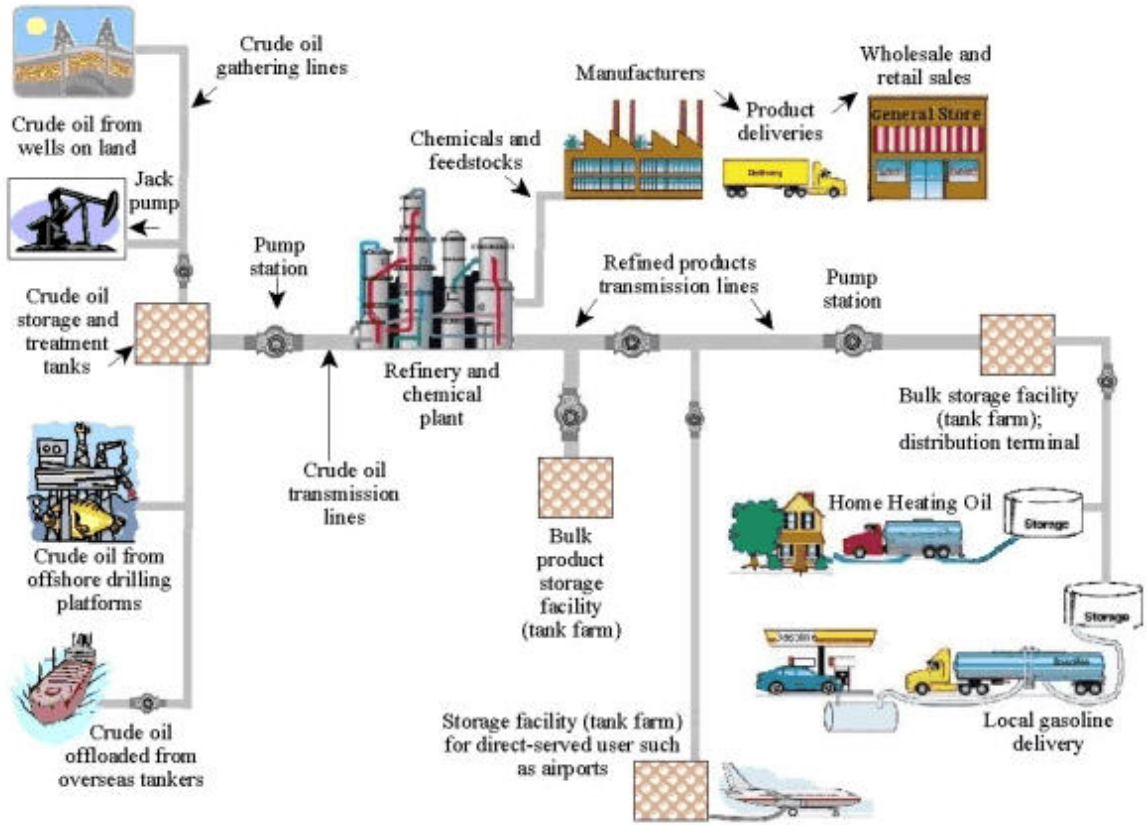
Vision Of Oil Pipeline Industry

- Conducts operations safely and with respect for the environment;
- Respects the privilege to operate granted to it by the public; and
- Provides reliable transportation of the crude oil and refined products upon which America and all Americans **rely.**

Petroleum Industry



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The National Oil Pipeline Network

165,000 miles national transmission network

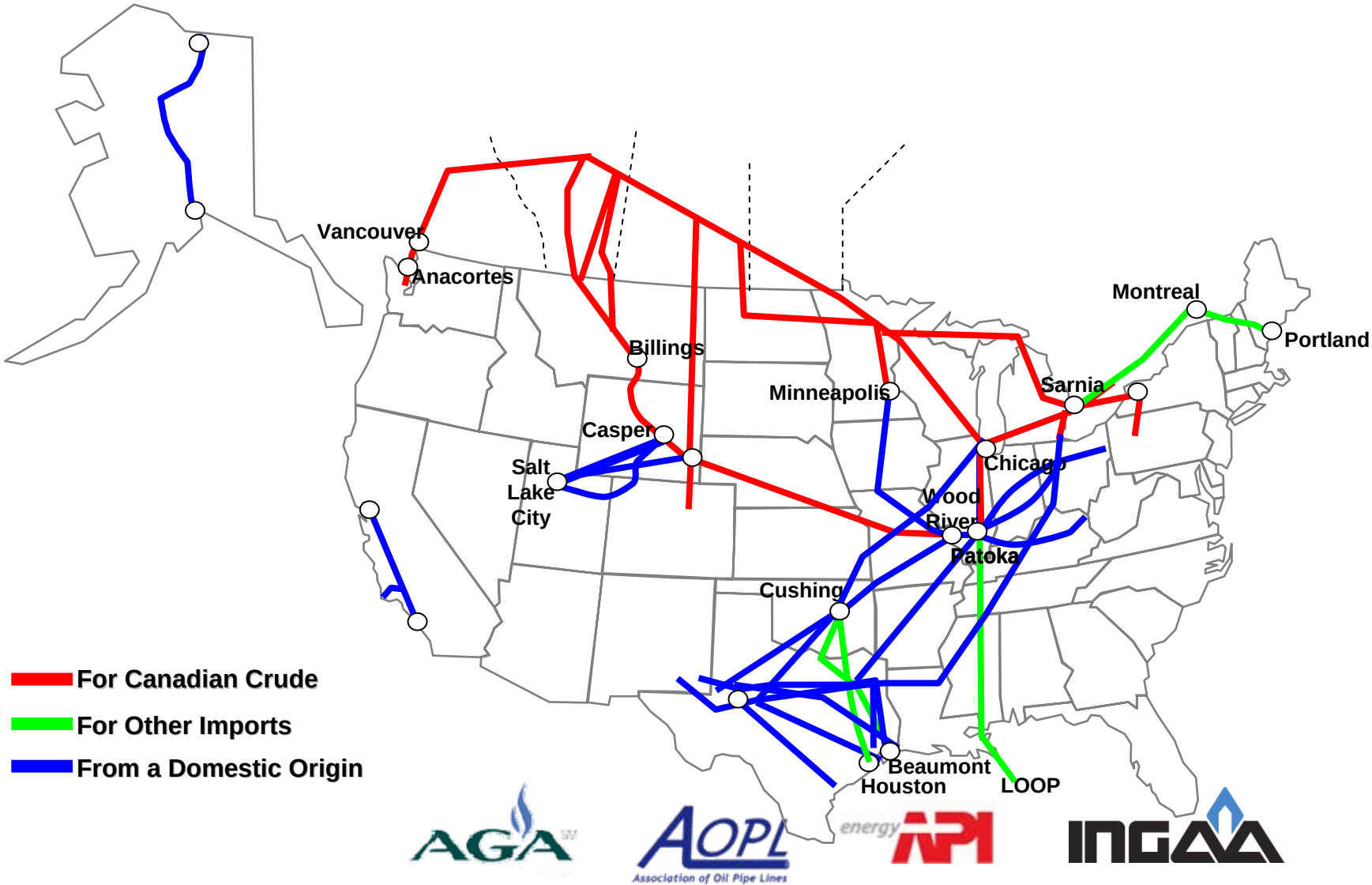
- Crude oil to refineries
- Refined products to end users

Volumes per year

- 1.8 trillion barrel miles refined products
- 1.6 trillion barrel miles crude oil
- 0.5 trillion barrel miles HVLs

Allegro
Energy Consulting

Selected Crude Oil Trunkline Systems



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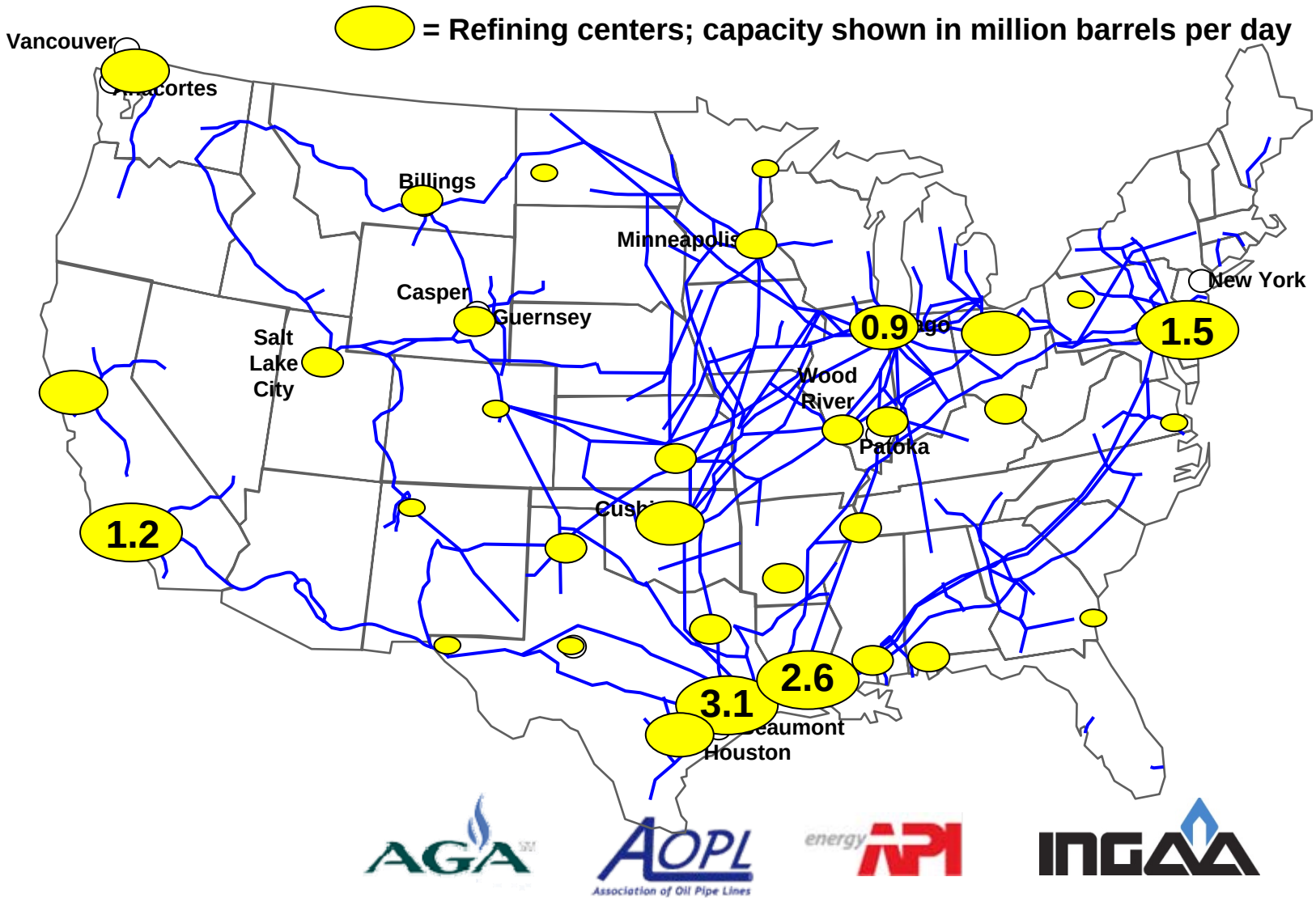
Energy Consulting

Major Refined Product Pipelines



Oil Pipeline Characteristics

- Oil Pipelines transport 2/3 of crude oil, refined products, refinery blendstocks, LPG's moved in U.S.
- Oil pipelines carry multiple products
- Oil pipelines do not own the products
- Customers are producers, refiners, major end-users – generally not consumers
- Alternative unregulated modes compete with oil pipeline transportation (e.g. barges, rail, trucks, local refineries)

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Challenges to Oil Pipeline Industry

- Need to grow and realign industry assets (e.g. Alberta oil sands development, products demand increases in Southwest.)
- Significant new expenditures
  - Capacity expansion/realignment
  - Integrity management costs (>$1 billion over next 5 years industry-wide)
  - Ultra Low Sulfur Diesel investment (approximately $230 million industry-wide)
- Public confidence in safe, environmentally responsible operations.

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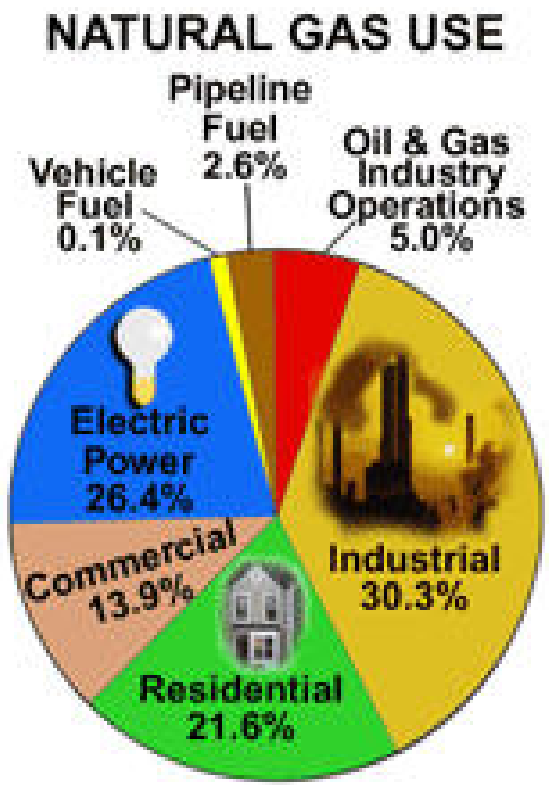
Natural Gas Benefits

Energy

- Residential
  - Heating
  - Cooking
- Commercial
  - Heating
  - Cooking
- Industry
  - Heating
  - Processing
- Electric Generation
- Transportation

Raw materials

- Fertilizer
- Plastics
- Chemicals



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What Natural Gas Pipelines Do

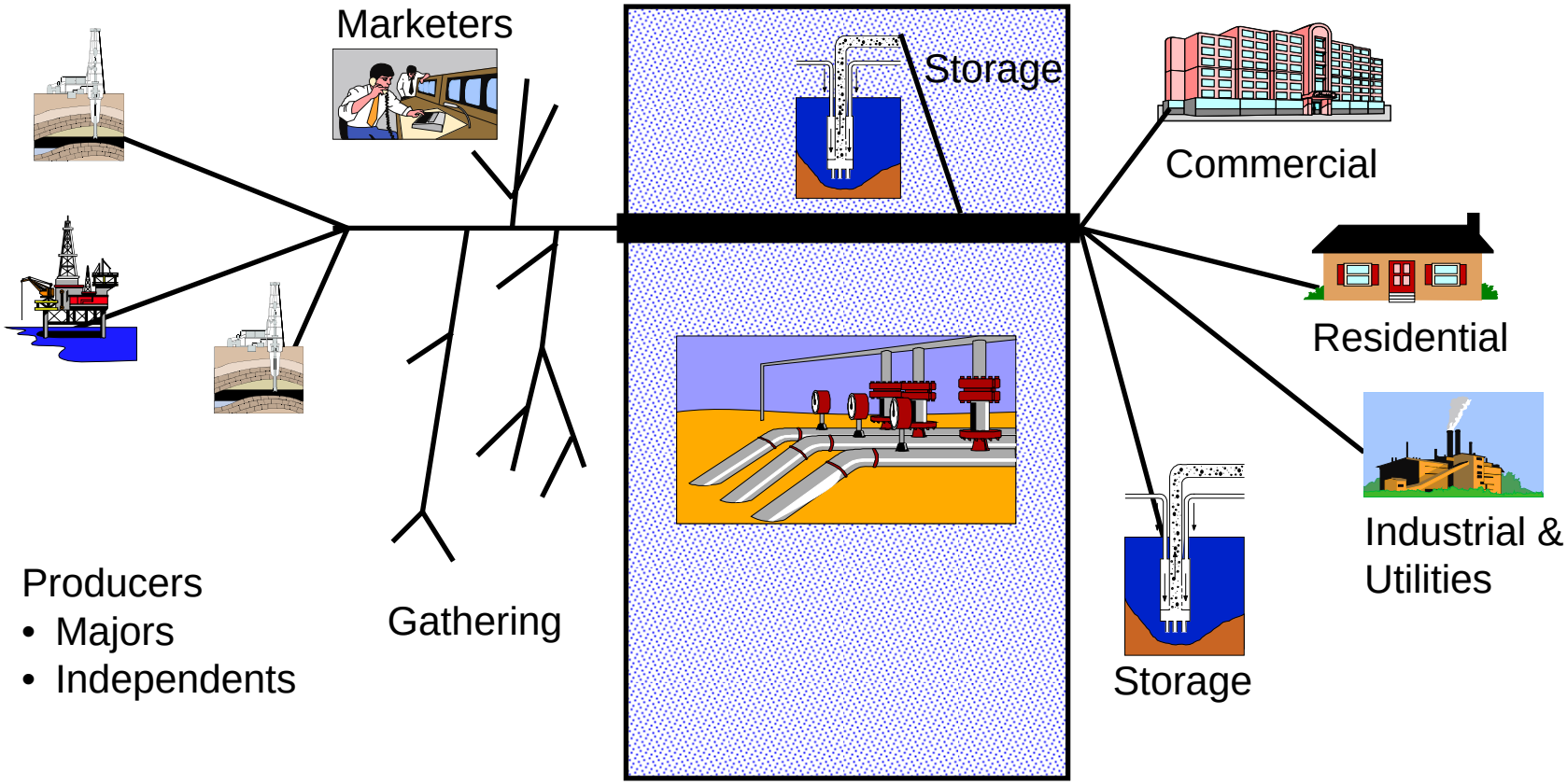
Transport flammable natural gas to customers under strict federal and state requirements through towns, cities, neighborhoods, and cross country where people live, work and play.

We MUST do it safely and reliably

Vision Of Natural Gas Pipeline Industry

- Conducts operations safely and with respect for the environment;
- Respects the privilege to operate granted to it by the public need and necessity; and
- Provides reliable transportation of the natural gas upon which America and all Americans **rely**.

The Natural Gas Industry



272,500
Gas Wells

30 Major
Interstate
Pipelines

1200
Distributors

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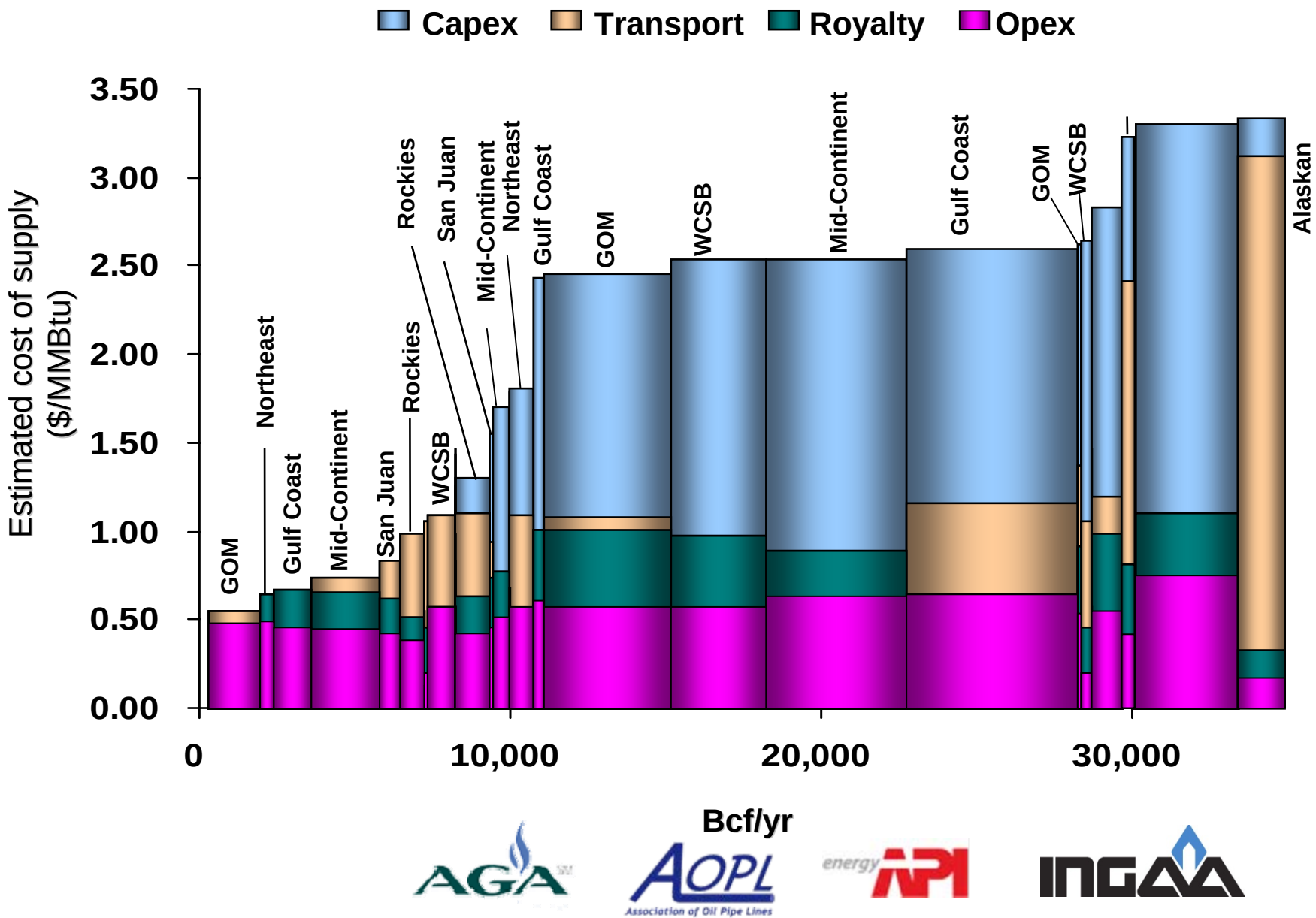
Gas supply costs vary, but price set by market



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The Natural Gas Pipeline Network

294,280 miles onshore gas transmission pipelines

6,637 miles offshore gas transmission pipelines

20,215 miles gas gathering pipelines

1,171,746 miles gas distribution mains

63,540,697 natural gas services

Gas Volume Consumed per Year

- 21,652 Trillion Cubic Feet

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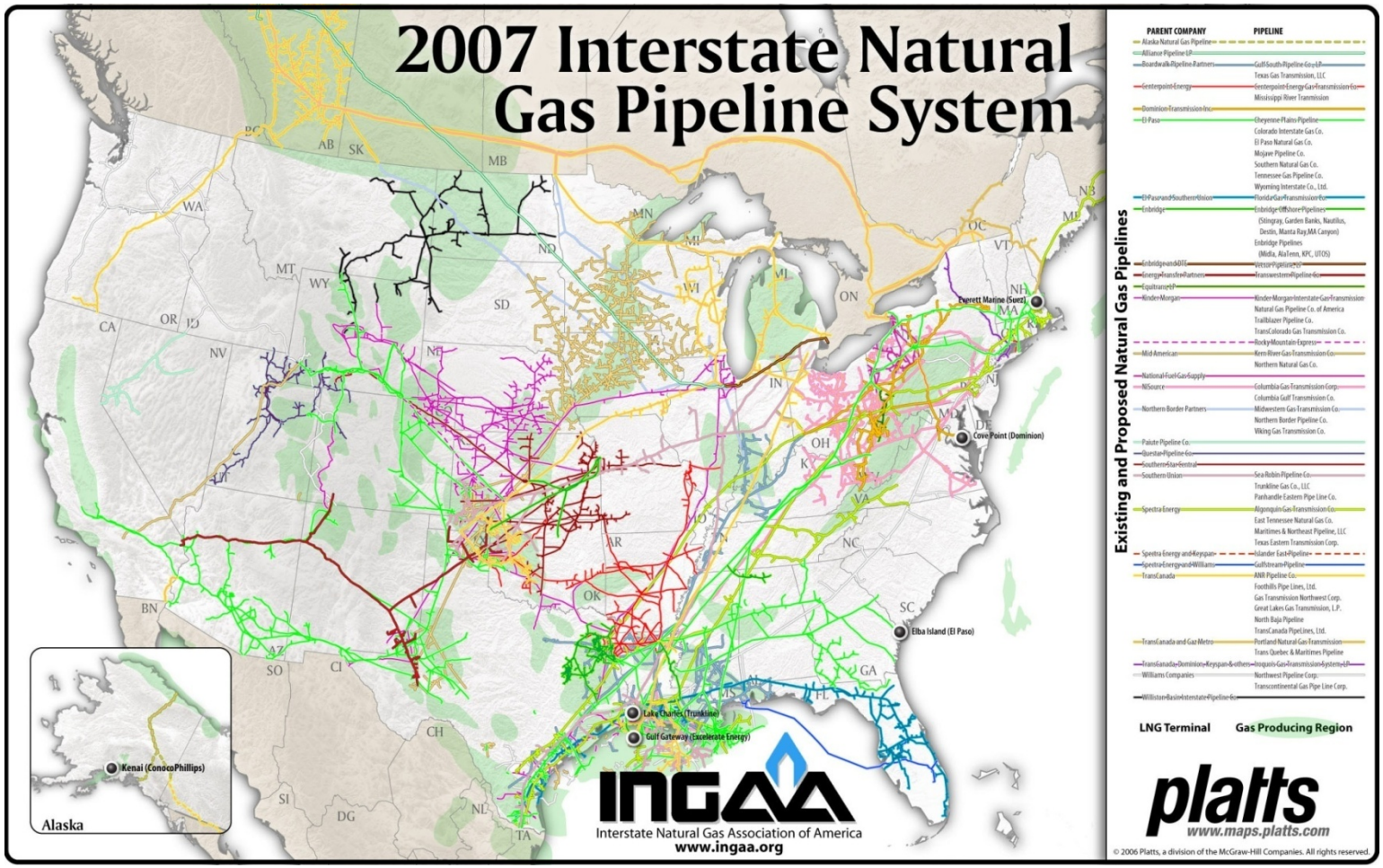
Interstate Natural Gas Pipelines



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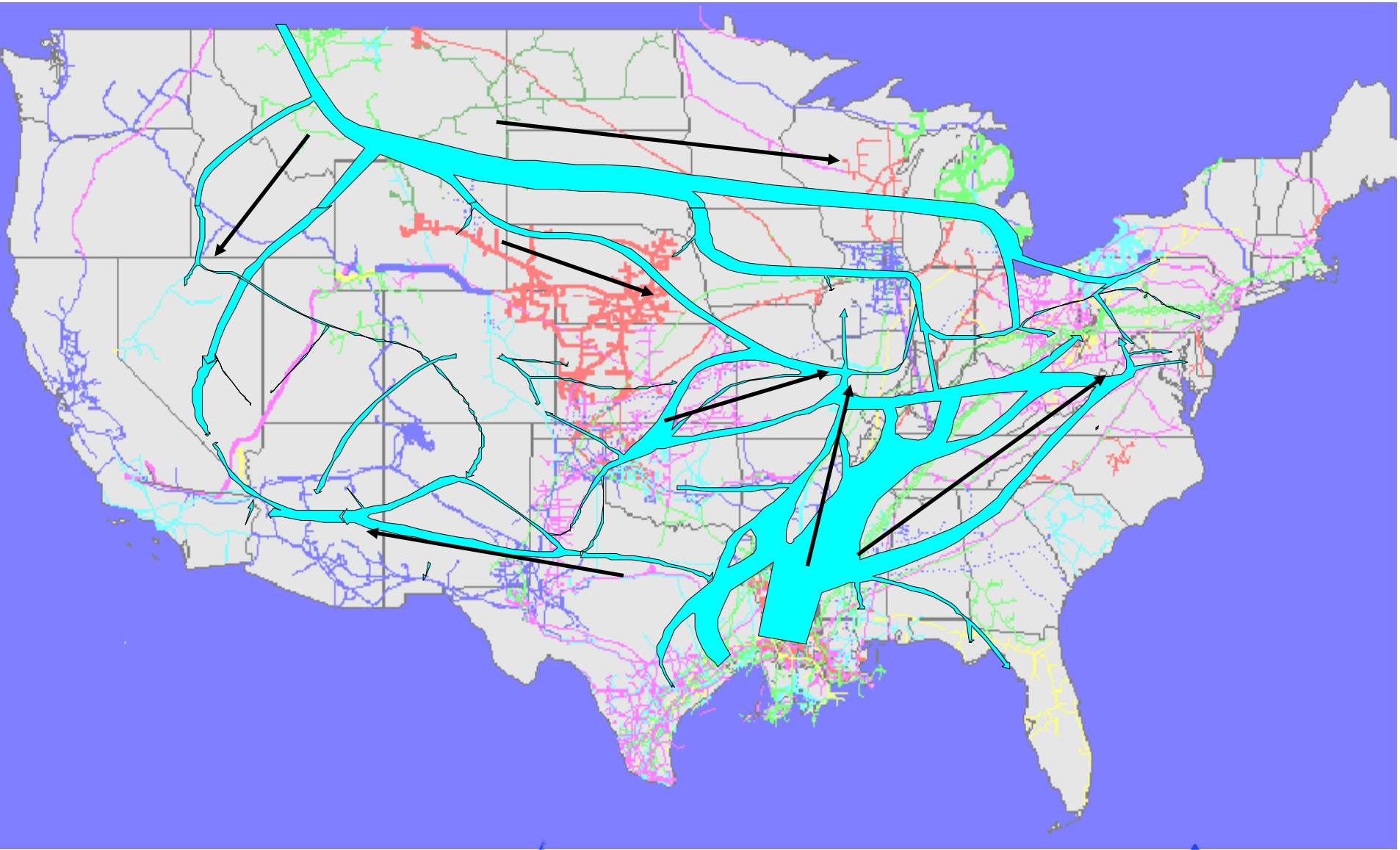
Interstate Natural Gas Deliverability



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Natural Gas Pipeline Characteristics

- Natural gas transmission pipelines transport 99% of natural gas moved in the U.S.
- Natural gas pipelines carry one product
- Interstate natural gas pipelines do not own the product
- Intrastate natural gas pipelines may own some of the product transported
- Transportation customers are producers, LDCs, marketers and major end-users
- Interstate transportation rates are regulated by FERC
- Intrastate transportation rates are regulated by State PUC

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Challenges to Natural Gas Pipeline Industry

- Need to grow and realign industry assets (e.g. Rocky Mountain, LNG, Alaska, Unconventional Gas) while expanding to new electric generation markets
- Significant new expenditures
  - Capacity expansion/realignment (7,200 miles interstate gas pipeline planned in near future)
  - Integrity management costs (>$5 billion over next 5 years industry-wide)
- Public confidence in safe, environmentally responsible operations.

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Regulatory Jurisdiction for New Pipelines

- **Interstate natural gas**
  - FERC authority under the Natural Gas Act
- **Intrastate natural gas**
  - State jurisdiction for routing and public need determination
- **Liquid pipelines**
  - State jurisdiction for routing and public need determination
- **Pipeline and Hazardous Material Administration (PHMSA) (All of the above pipelines)**

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Interstate Natural Gas – FERC Authority

Siting (NGA) (NEPA)

- **Federal Energy Regulatory Commission (FERC)**
  - **Corp of Engineers**
  - **Bureau Land Mamagement**
  - **Fish and Wildlife**
  - **Historic Preservation**
  - **Environmental Protection Agency**
  - **States**
  - **Local**

State-regulated Pipeline Approvals

- **State programs may require one or more of:**
  - Certificate of Need from state public utility commission -or- Statutory designation of public need for utilities
  - Routing Permit - Comprehensive review of route alternatives
  - State environmental assessment and permitting

- **Federal permitting still applies**
  - Environmental must comply with National Environmental Policy Act
    - U.S. Army Corps of Engineers: jurisdictional waters
    - Fish & Wildlife, etc.
  - Federal landowner- land access for pipeline

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Agenda

2. Rights-of-Way

- Specification
- Acquisition
- Development
- Maintenance

Agenda

2. Rights-of-Way

- **Specification**
  - **Special needs/provisions during construction**
  - **Needs for operations and maintenance**
  - **Emergency access**
  - **Economic regulator expectation for ROW width**

Acquisition

Development

Maintenance

Permanent Pipeline Easement

- Facilitate Access for:
  - Operation
  - Inspection
  - Maintenance
- Identification of Pipeline Location
  - Company
  - Landowners
  - Excavators

Pipeline Company Needs

- Operation
  - Meter Reading
  - Liquid Removal
  - Valve operation
- Inspection
  - Encroachment
  - One Call Response
  - Erosion
  - Leak
  - Corrosion
  - Appurtances
  - Environmental
- Maintenance
  - Erosion Repair
  - Coating Repair
  - Pipe repair
  - Cathodic Protection System Modification
  - Pipeline Replacement
  - Hydrostatic Pressure Testing
- Emergency Access
  - Leak Repair
  - Rupture Repair
  - Staging Area

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Other Stakeholder Needs

- Landowner
  - Easement
- Customers
  - Transportation
- Regulatory
  - Environment
  - Safety
  - Public Need and Necessity

Proposed width of right-of-way

- **Permanent right-of-way**
  - Varies depending on route density
  - Narrower ROW (< 50 feet) provides little buffer from development
  - Wider ROW (> 75 feet) provides buffer but width often questioned by landowner and regulators
  - Are there multiple pipelines in easement?
  - Typical goal is to strive for 25 feet from edge of easement/utility
- **Temporary Work Space**
  - Depends on size of pipeline
  - Deeper ditch requires soil space
  - Significant space is needed for 2-lanes of equipment

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Temporary Work Space

- **Additional construction “roadway”**
  - Equipment
  - Top and sub soil storage
  - Pipe welding
  - Passing lane for moving equipment
- **Additional room often needed at roads and river crossings**

Example: Interstate Natural Gas Pipeline ROW Construction

Pipeline Operator Proposes the ROW Construction

- Standard Practices (Natural Gas Act)
  - Minimize Costs
  - Minimize Time
- Environmental Constraints (National Environmental Policy Act)
  - Department of Interior
  - Environmental Protection Agency
  - Corp of Engineer
- Safety
  - Public Safety
  - Personnel Safety

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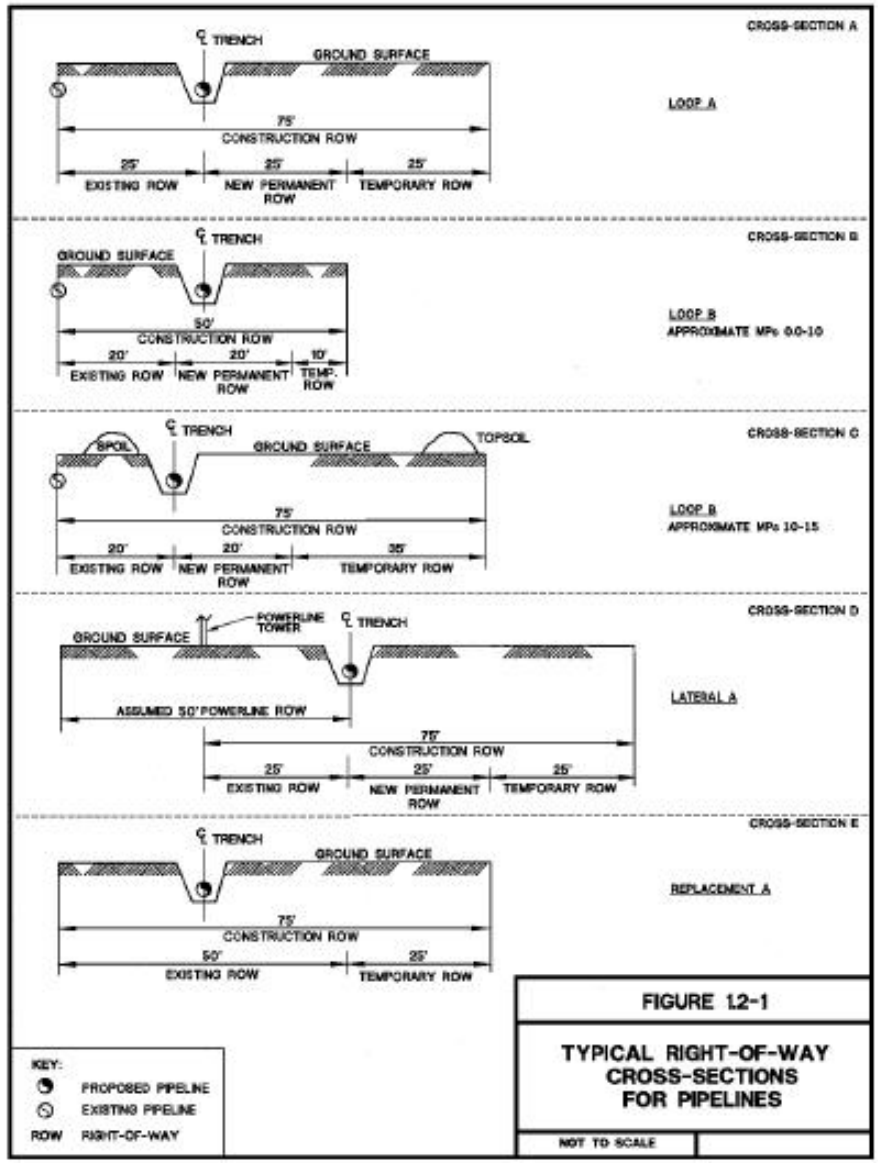
Example: Interstate Natural Gas Pipeline ROW Construction Specification

- Normal Construction
  - Temporary Right-of-Way Width Requirements for Pipeline Construction; INGAA Foundation 1999
  - FERC Approval
- Special needs during construction
  - Wetlands
  - Suburban



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Example: Engineering Variables to Alter Construction ROW Width

TABLE 2

Engineering Variables that Affect Construction Right-of-Way Width

Variable	Decrease Width	Increase Width	*Extra Work Space
1. Environmental, Cultural, and Archeological	X		X
2. Design Considerations			
Pipe Diameter (Included in the Recommended Width)	X	X	
Pipe Depth (Included in the Recommended Width)	X	X	
3. Terrain			
Undulating Alignment Profile		X	X
Alignment Grade		X	X
Side Slope Grade		X	X
4. Soils and Rock			
Soil and Rock Type	X	X	
Soil and Rock Depth	X	X	
Rock Disposition by Stockpiling		X	X
Soil Segregation Requirements	X	X	X
Special Erosion Control Requirements		X	
5. Landowner Requirements			
Construction Through Narrow Corridors Bounded by Structures	X		
Timber Disposition by Stockpiling		X	X
6. Construction Plans			
Inadequate Temporary Access Roads		X	
Automatic Welding Method		X	
7. Special Construction Work Areas			
Foreign Structure			X
Surface Land Use Classification	X	X	X
Construction Through Wetlands	X	X	X
8. Uncertainties			
Unknown Underground Structures-Frequency of Tile	X	X	
Unexpected Inclement Weather		X	

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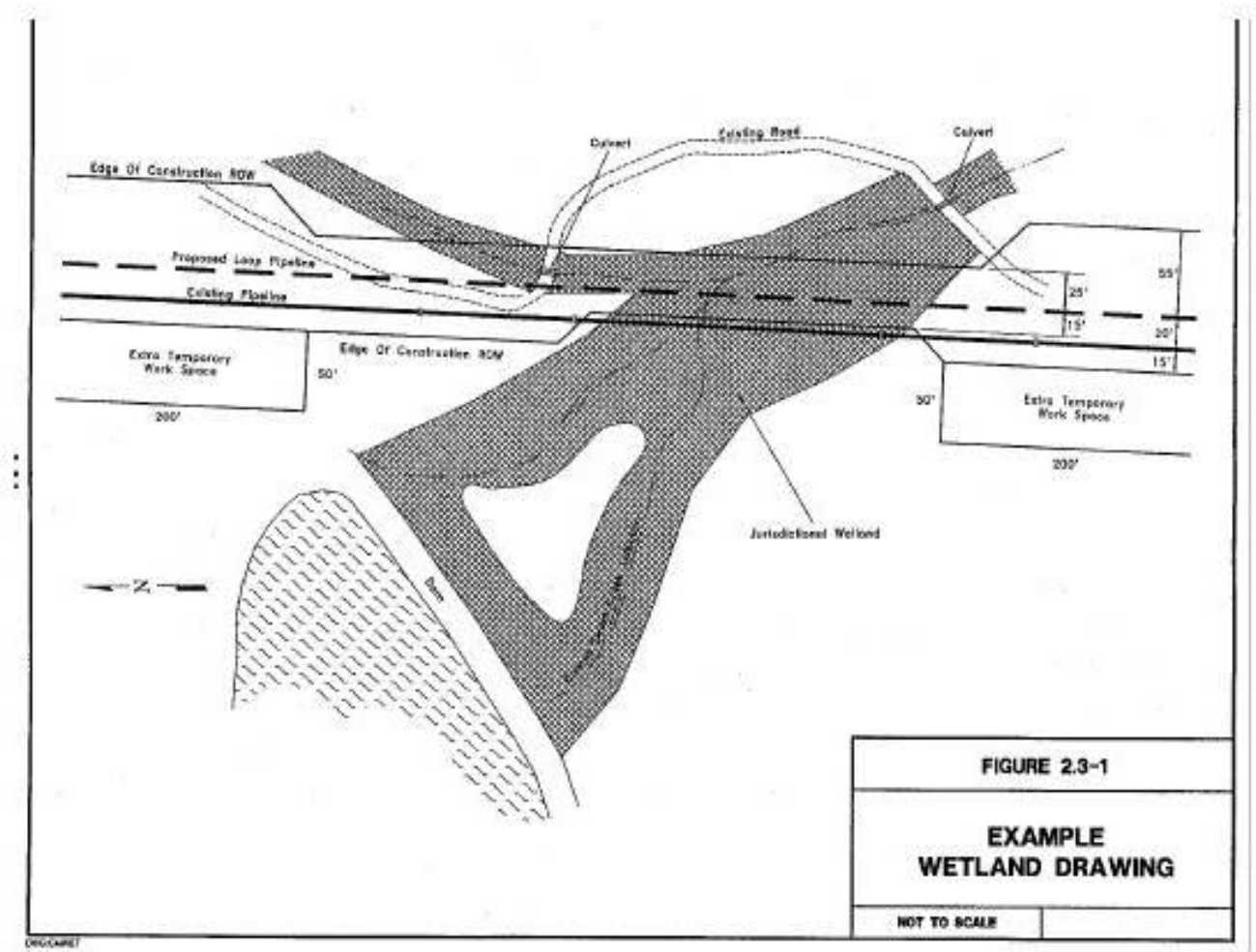
Example: Wetlands Construction Techniques

- Reduced Temporary ROW Width
- Seasonal Construction
- Wooden Mats
- Horizontal Directional Drilling



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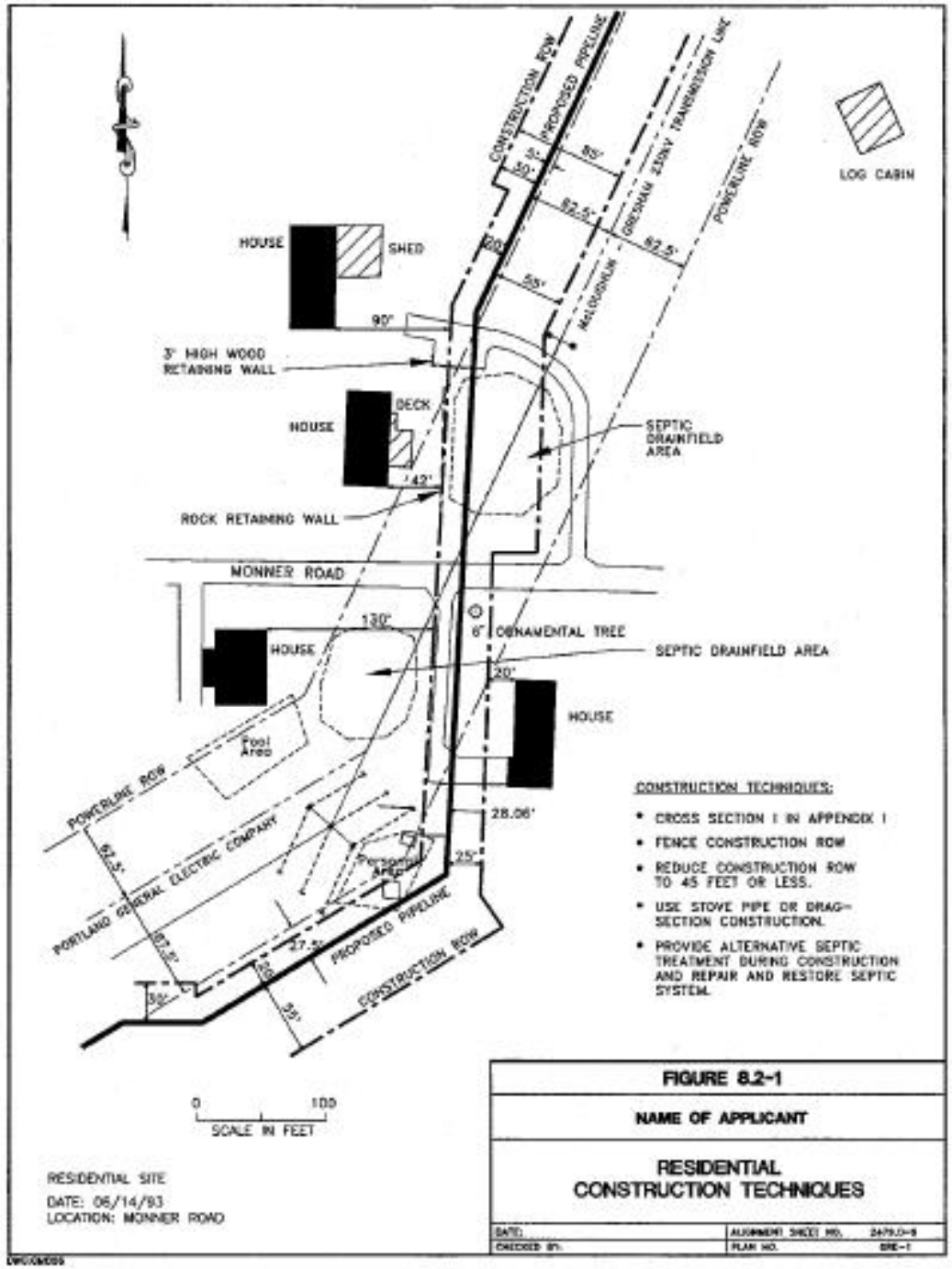
Example: Residential Construction Technique

- Reduced ROW Widths
- Stove Piping
- Boring
- Spoil Relocation
- Sheeting



Agenda

2. Rights-of-Way

Specification

- **Acquisition**
  - Selecting pipeline routes
  - Obtaining easements

Development

Maintenance

Factors for Assessing Route Alternatives

- First consideration is meeting the energy demand and market need
  - Pipeline must get from Point A to Point B
- System Alternatives
  - Can company's existing system be optimized?
  - Are there other efficient modes of transportation?
  - What is optimum size of pipeline needed?
- Pipeline Routing Alternatives consider:
  - Constructability and minimizing distance
  - Existing utility corridors and routes
  - Population and development
  - Minimizing or mitigating affects on unique environmental areas

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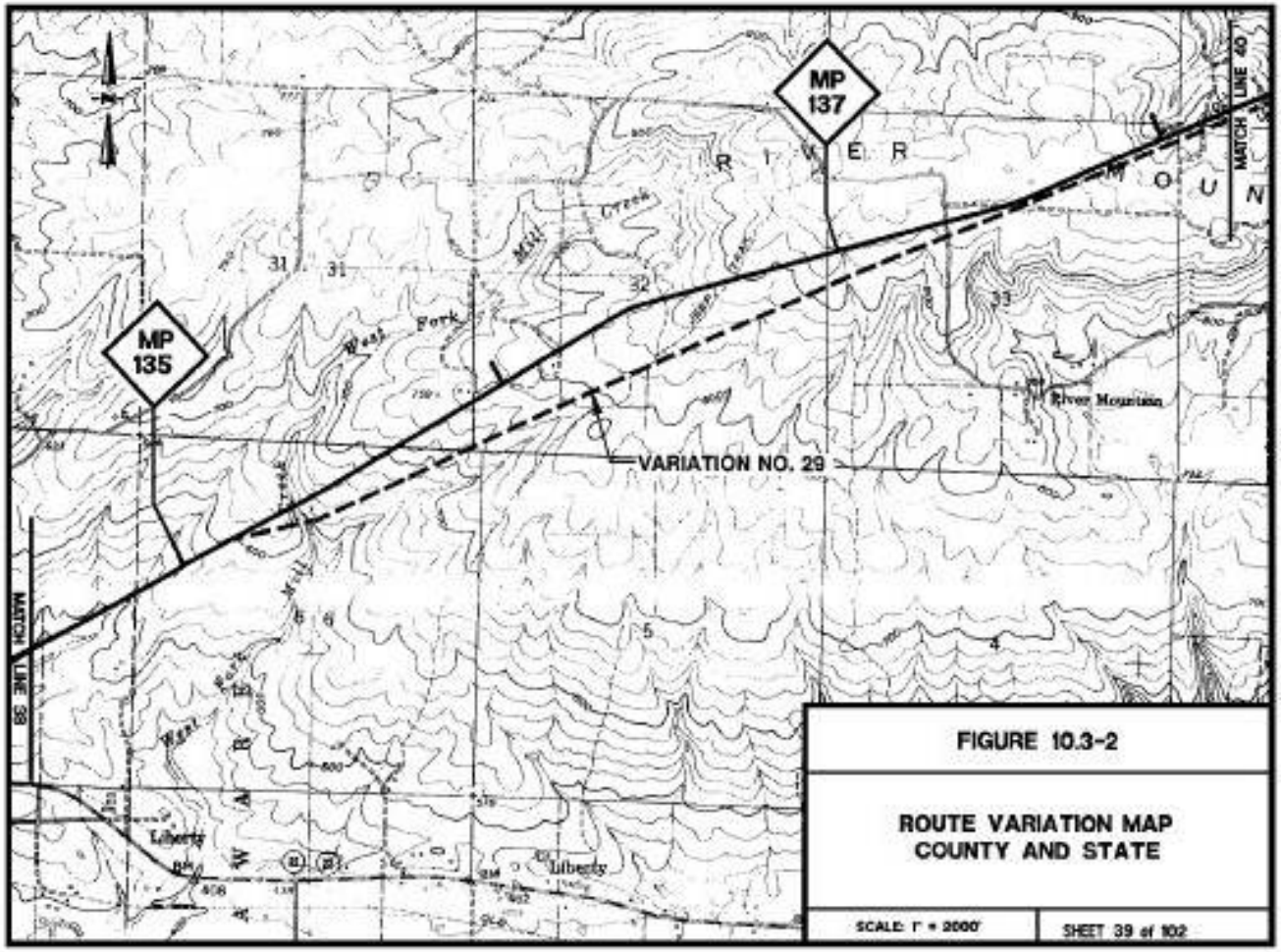
Route conditions vary widely

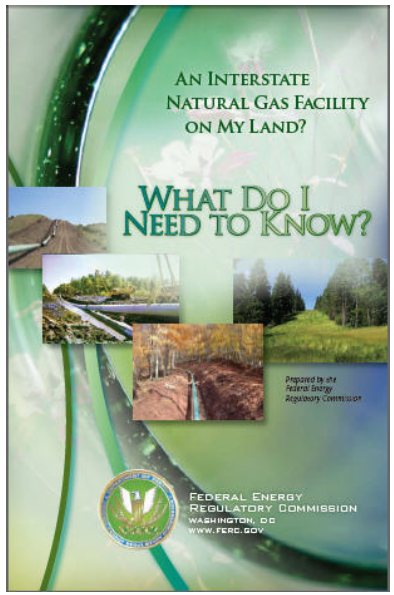
- Rural farming and need to protect agricultural production
- River crossings where temporary bridge and bank restoration needed
- Wetland crossings: narrower workspace and minimal equipment
- More developed areas with competing desires to minimize impact and provide “buffer”

Example: Selecting alternate pipeline routes



Example: Obtaining Right of Way

- Type
  - Below Grade Pipe
    - Easements
  - Above Grade Facilities
    - Fee Simple
- Temporary Construction
- Permanent Easement
- ROW access
- ROW Damages
  - Easement Conditions



Q: How do pipelines obtain a right-of-way?

A: The pipeline company negotiates a right-of-way easement and compensation for the easement with each landowner. Landowners may be paid for loss of certain uses of the land during and after construction, loss of any other resources, and any damage to property. If the Commission approves the project and no agreement with the landowner is reached, the pipeline may acquire the easement under eminent domain (a right given to the pipeline company by statute to take private land for Commission-authorized use) with a court determining compensation under state law.

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Agenda

2. Rights-of-Way

Specification

Acquisition

- **Development**
  - **Typical provisions of ROW/easement agreements**
  - **Encroachment prevention**

Maintenance

Provisions of typical ROW/easement agreements

- the right to construct, lay, maintain, operate, renew, alter, repair, remove, change the size of, and replace pipelines
- the right to clear all trees, undergrowth and other obstructions from the right of way

Definition of a Setback

- **Spacing between a Pipeline and Some Activity**
  - Buildings
  - Vegetation
  - Excavation
  - Explosive Charges
  - Wildlife Habitat
  - Vehicle Loading
  - Visual Impact
- **Today's Definition is Public Safety**

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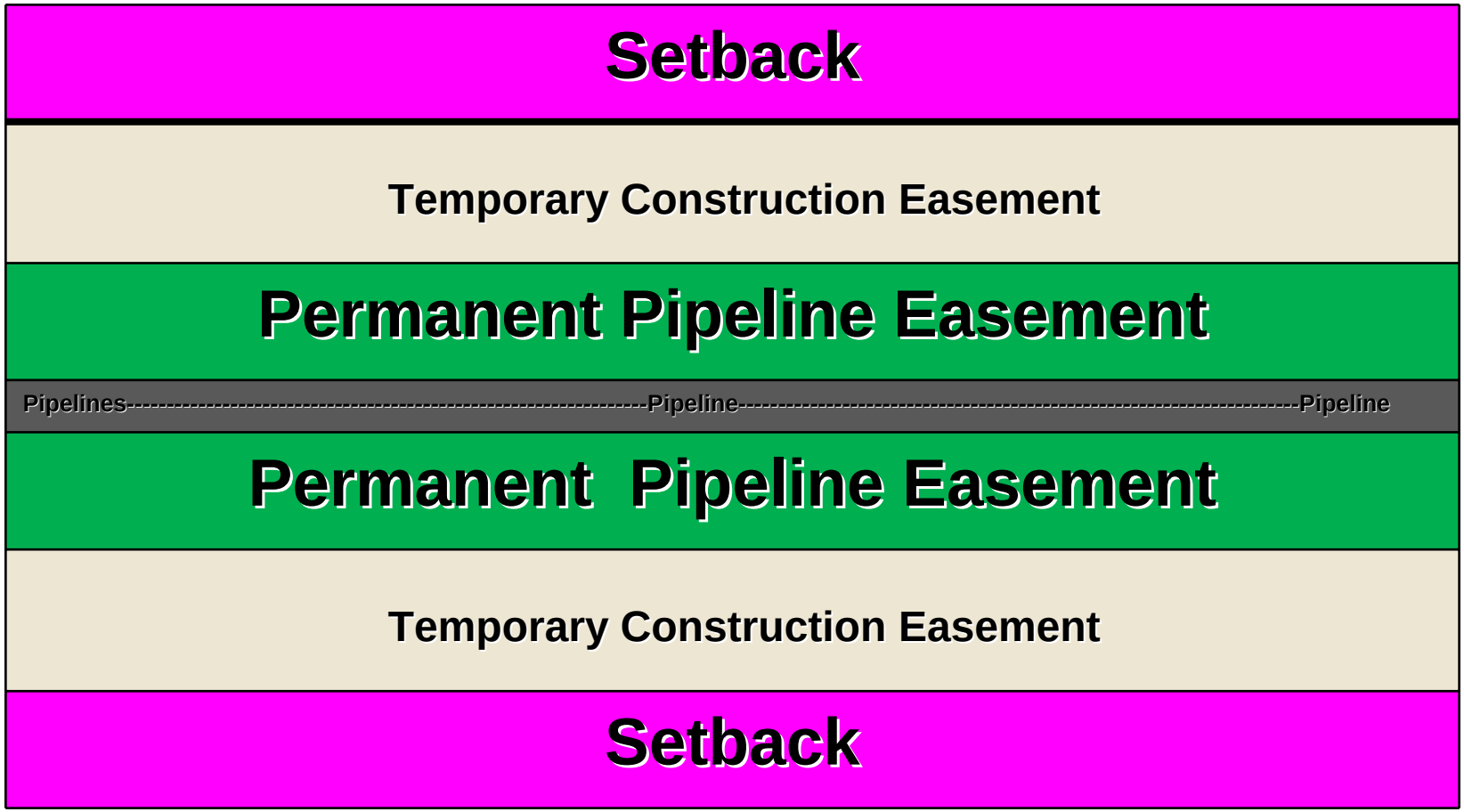
Terminology



ROW or near ROW Development

- Try to work with developers early
- Incorporate ROW as green space
- Walkways & benches add to ambiance
- Stay in touch with homeowners associations

Agenda

2. Rights-of-Way

Specification

Acquisition

Development

- **Maintenance**
  - Encroachment prevention
  - Control of vegetation
  - Desired state of ROW for patrolling

On ROW

- Not acceptable to have permanent structures, significant grade changes, large landscaping
- Need to be able to inspect, operate and maintain the pipeline safely & effectively
- A clearly defined corridor blending with surroundings helps neighbors, residents and excavators manage activities

ROW Clearing Enables:

- Aerial surveillance to detect threatening excavation activities
- Visual corridor to defend against unauthorized excavation and development
- Routine maintenance access
- Emergency response access

Safety is the paramount reason for ROW clearing

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Control of Vegetation on ROW

- ROWs are cleared of vegetation that could impede appropriate viewing and inspection.
- ROWs are cleared and maintained only to the widths allowed in the easement, which range in size but are typically 30’ to 50’
- Notifications to landowners typically completed prior to starting the actual clearing process
- Periodic vegetation control measures include mechanical mowing and tree canopy trim removal.
- Tree canopy removal may extend to trees rooted outside of the ROW but have canopy that overhangs into the ROW
- *Interstate natural gas pipelines subject to FERC certificate conditions*

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Adjacent to ROW

- Generally no restrictions beyond ROW or easement
- Possible exceptions – Activities impacting the pipeline
  - Contouring or terracing
  - Blasting
- Work with operator to maintain safety

Agenda

3. Pipeline Integrity Management (IM)

- IM Principles
- Gas IM
- Liquid IM

Agenda

3. Pipeline Integrity Management (IM)

- **IM Principles**
  - **Threat Identification**
  - **Risk Characterization**
  - **Preventive and Mitigative Measures**

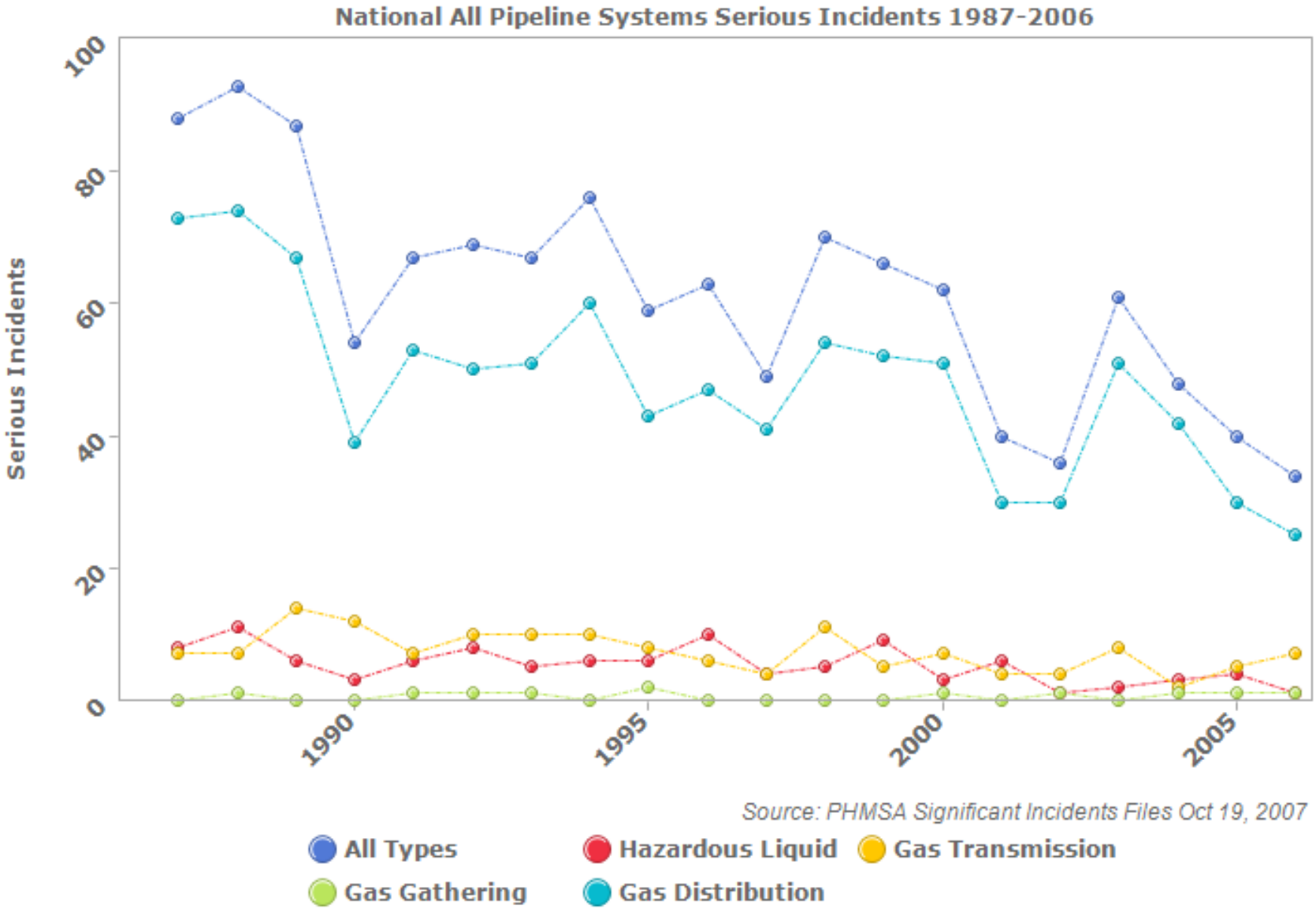
Gas IM

Liquid IM

Industry Goals

- **No deaths**
- **No injuries**
- **No releases to the environment**
- **No operating errors**
- **Reliable service to our shippers, customers and communities**
- **Full compliance with requirements**

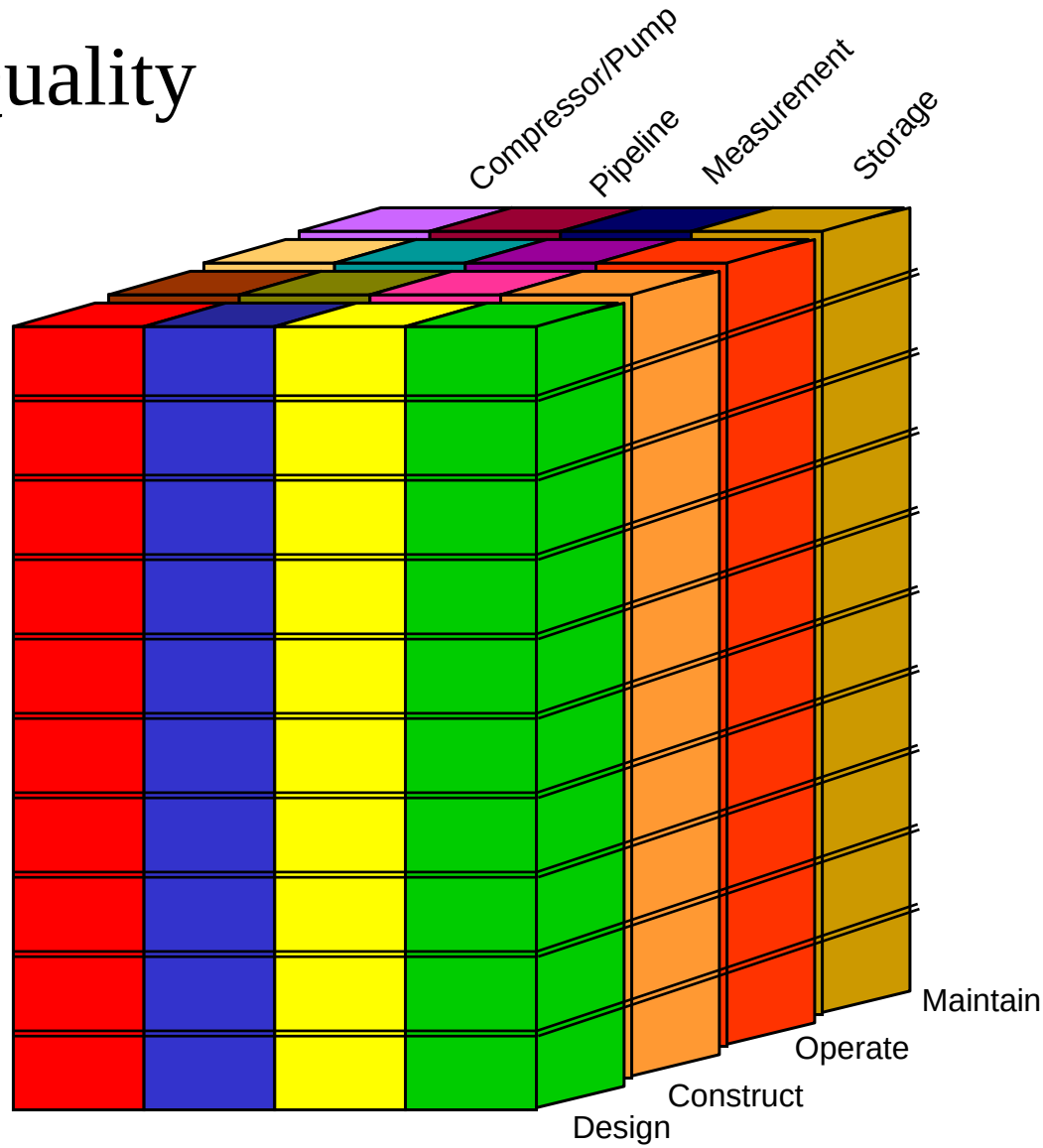
Serious Incidents (All Pipelines)



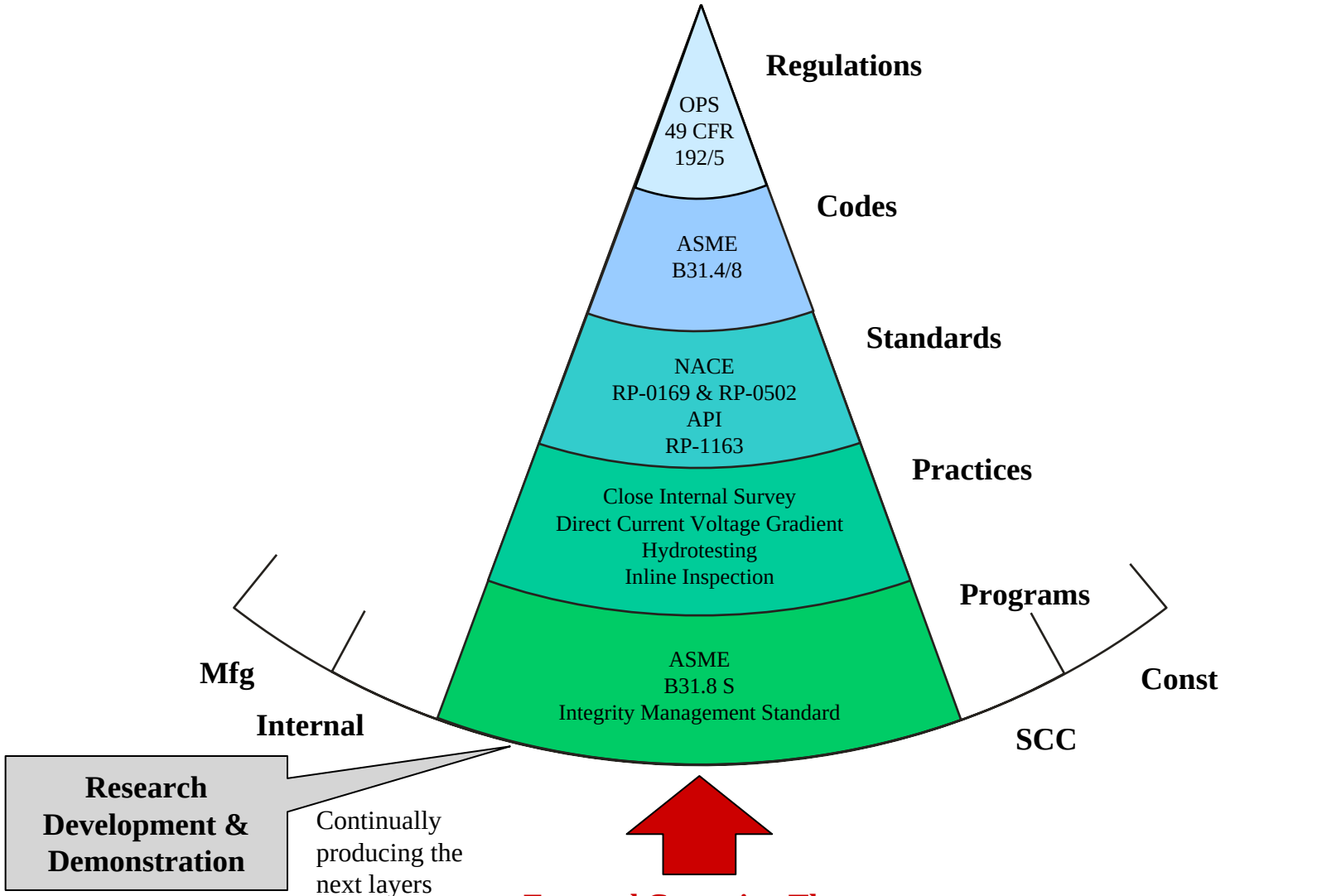
es

Integrated Quality Control

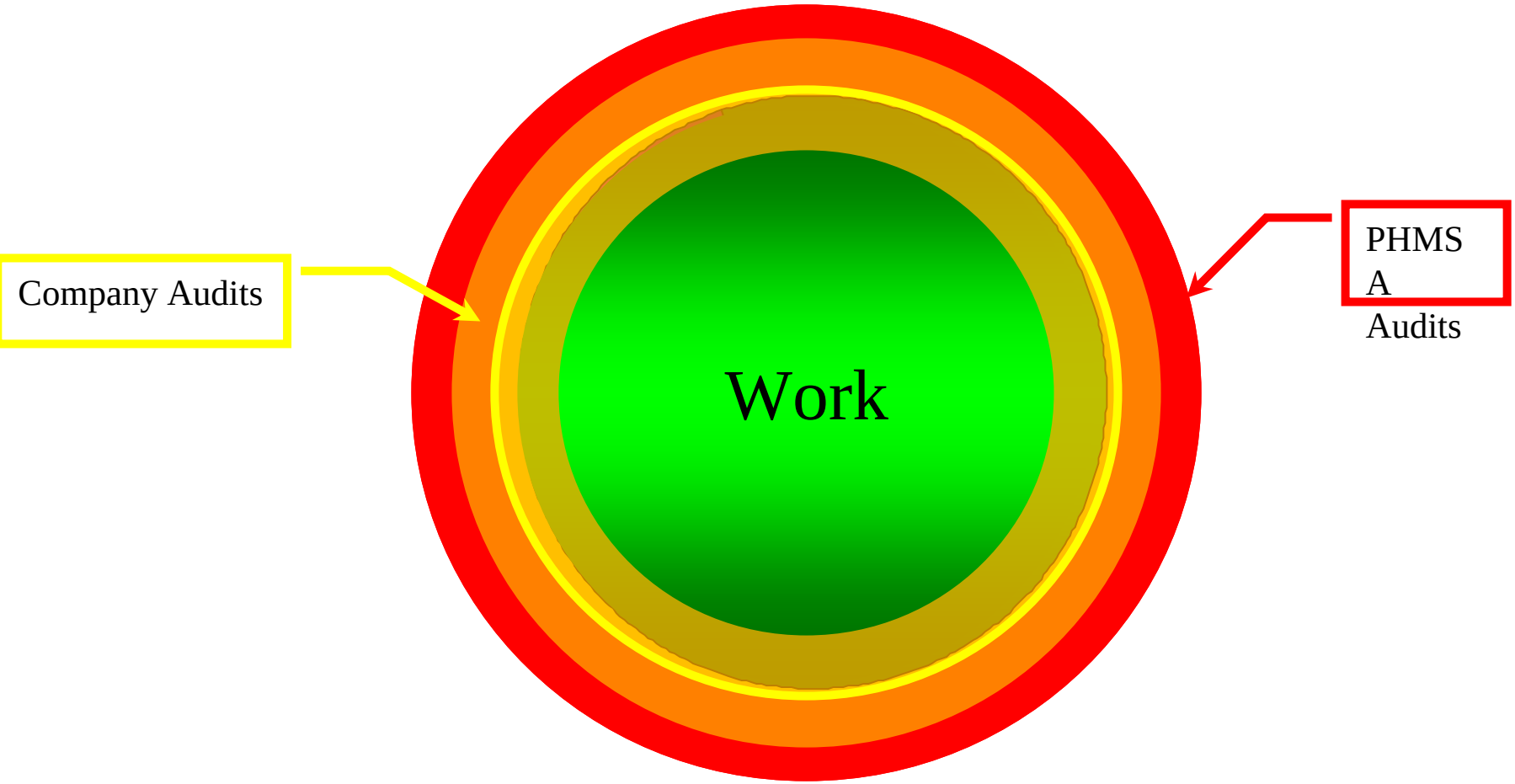
- Corrosion Control
- Integrity Management
- Safety
- Environmental
- Communications
- Security
- Emergency Response
- Control Center
- Regulatory Compliance
- Operator Qualification



Pipeline Safety - Layers of Protection



Layers of Protection



Risk Characterization

- Risk: A measure that combines both the likelihood of conditions or events producing an undesired outcome with the type and magnitude of the resultant consequences

- **Risk to Public = Probability * Consequence**

Threat Identification

- In evaluating the integrity of the line, the operator must integrate all available information, including at a minimum:
  - the potential for excavation or outside force damage, considering potential new development along the line,
  - information about the potential impacts of a release on the HCA (e.g., drinking water intake),
  - data gathered from the integrity assessments required by this rule, and
  - cathodic protection surveys, patrolling, and other maintenance and surveillance activities.

Threat Identification *(example: natural gas transmission)*

APPENDIX 1

2002 to 2006 Onshore Gas Transmission Reportable Incident Data

Cause	2002	2003	2004	2005	2006	Total
External Corrosion	14	10	11	12	11	58
Internal Corrosion	0	5	2	3	6	16
Earth Movement	1	1	1	5	2	10
Lightning	0	2	0	0	1	3
Heavy Rains/Floods	3	0	2	13	0	18
Temperature	0	0	0	1	0	1
High Winds	1	0	0	3	0	4
Operator Excavation Damage	1	2	2	2	4	11
Third Party Excavation Damage	9	13	20	14	16	72
Fire/Explosion as Primary Cause	0	1	3	1	0	5
Car, Truck or other Vehicle	4	5	6	5	8	28
Rupture of Previously Damaged Pipe	0	0	0	1	1	2
Vandalism	0	0	0	1	1	2
Body of Pipe	2	3	4	3	3	15
Component	4	0	2	2	2	10
Joint	2	3	0	1	4	10
Butt	0	4	1	3	7	15
Fillet	1	0	2	0	0	3
Pipe Seam	4	6	2	0	2	14
Malfunction of Control/Relief Equipment	1	3	9	8	5	26
Threads Stripped, Broken Pipe Coupling	1	3	1	2	3	10
Ruptured or leaking Seal/Pump Packing	0	0	0	1	2	3
Incorrect Operations	0	4	0	2	4	10
Miscellaneous	4	8	8	12	8	40
Unknown	2	6	3	6	11	28
	54	79	79	101	101	414

Consequences of Hazardous Liquids Pipeline Releases

Safety Consequences, Hazardous Liquids Pipelines								
Year	Public Fatalities		Industry Fatalities		Public Injuries		Industry Injuries	
2002	0	0%	1	100%	0	0%	0	0%
2003	0	0%	0	0%	0	0%	5	100%
2004	5	100%	0	0%	15	93%	1	6%
2005	0	0%	2	100%	2	100%	0	0%
2006	0	0%	0	0%	2	100%	0	0%
Totals	5	62%	3	37%	19	76%	6	24%

Property Damages (Millions of 2006 dollars)								
Year	Total Property	Public Property [Reimbursed]		Industry Property		Product Lost	
2002	$49.0	$37.4	76%	$9.7	19%	$1.9	3%
2003	$53.4	$30.4	56%	$21.5	40%	$1.5	2%
2004	$70.9	$20.2	28%	$48.5	68%	$2.3	3%
2005	$123.9	$82.4	66%	$38.2	30%	$3.3	2%
2006	$38.2	$12.4	32%	$21.8	57%	$4.0	10%
Totals	$335.4	$182.8	54%	$139.7	41%	$12.9	3%

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Consequences of Natural Gas Transmission Pipeline Releases

National Gas Transmission Onshore: Serious Incident Details: 1987-2006

Cause	Number of Incidents	% total Incidents	Fatalities	Injuries	Property Damage [B] [C]	% of Property Damage
CORROSION						
VARIOUS	5	3.4%	12	5	$1,438,680	1.7%
Sub Total	5	3.4%	12	5	$1,438,680	1.7%
EXCAVATION DAMAGE						
OPERATOR EXCAVATION DAMAGE	1	0.6%	0	1	$84,121	0.1%
THIRD PARTY EXCAVATION DAMAGE	8	5.4%	5	4	$1,621,389	1.9%
VARIOUS	42	28.5%	12	51	$38,673,784	46.5%
Sub Total	51	34.6%	17	56	$40,379,294	48.6%
HUMAN ERROR						
INCORRECT OPERATION	4	2.7%	0	4	$0	0.0%
Sub Total	4	2.7%	0	4	$0	0.0%
MATERIAL FAILURE						
MALFUNCTION OF CONTROL/RELIEF EQUIPMENT	1	0.6%	0	2	$154	0.0%
RUPTURED OR LEAKING SEAL/PUMP PACKING	1	0.6%	0	1	$0	0.0%
THREADS STRIPPED, BROKEN PIPE COUPLING	3	2.0%	0	3	$1,758,456	2.1%
VARIOUS	11	7.4%	1	12	$5,731,642	6.9%
Sub Total	16	10.8%	1	18	$7,490,252	9.0%
NATURAL FORCE DAMAGE						
VARIOUS	2	1.3%	0	2	$7,540,486	9.0%
Sub Total	2	1.3%	0	2	$7,540,486	9.0%
OTHER OUTSIDE FORCE DAMAGE						
CAR, TRUCK OR OTHER VEHICLE NOT RELATED TO EXCAVATION ACTIVITY	4	2.7%	0	4	$123,286	0.1%
Sub Total	4	2.7%	0	4	$123,286	0.1%
ALL OTHER CAUSES						
MISCELLANEOUS	1	0.6%	0	1	$3,351	0.0%
UNKNOWN	2	1.3%	0	2	$1,307,925	1.5%
VARIOUS	57	38.7%	7	97	$23,627,434	28.4%
Sub Total	60	40.8%	7	100	$24,938,710	30.0%
Totals	142	96.6%	37	189	$81,910,708	98.6%

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Likelihood Assessment

- The results of the likelihood assessment also provide the operator with information on the significance of different pipeline threats at different locations, allowing them to carry out actions that reduce the likelihood of a pipeline failure. For example, an operator may choose to conduct internal inspections on those pipeline sections that are shown to be most susceptible to corrosion, to identify where corrosion might be occurring, and to repair any damage before the pipe fails.

Consequence Assessment

- The results of the consequence assessment provide the operator with information on the significance of consequences of accidents at different locations, so that operators can carry out steps to reduce or eliminate those consequences. For example, an operator may place specialized emergency response equipment at an environmentally sensitive site to allow for quick response should a pipeline release occur.

Risk Determination

- The final step in risk assessment for a pipeline is to use the results of the likelihood and consequence assessments to determine the overall risk at each pipeline location. This allows the operator to ensure that sections identified as having the highest risk are assigned top priority for actions that will reduce the likelihood of a release, reduce its potential consequences, or both.

Protective and Mitigative Actions

- Operators must conduct risk analyses for the line segments that could affect HCAs. These analyses should identify and evaluate the need for additional preventive and mitigative actions to protect HCAs. Such measures might include:
  - damage prevention best practices,
  - enhanced cathodic protection monitoring,
  - reduced inspection intervals,
  - enhanced training,
  - conducting drills with local emergency responders, and
  - other management controls

Agenda

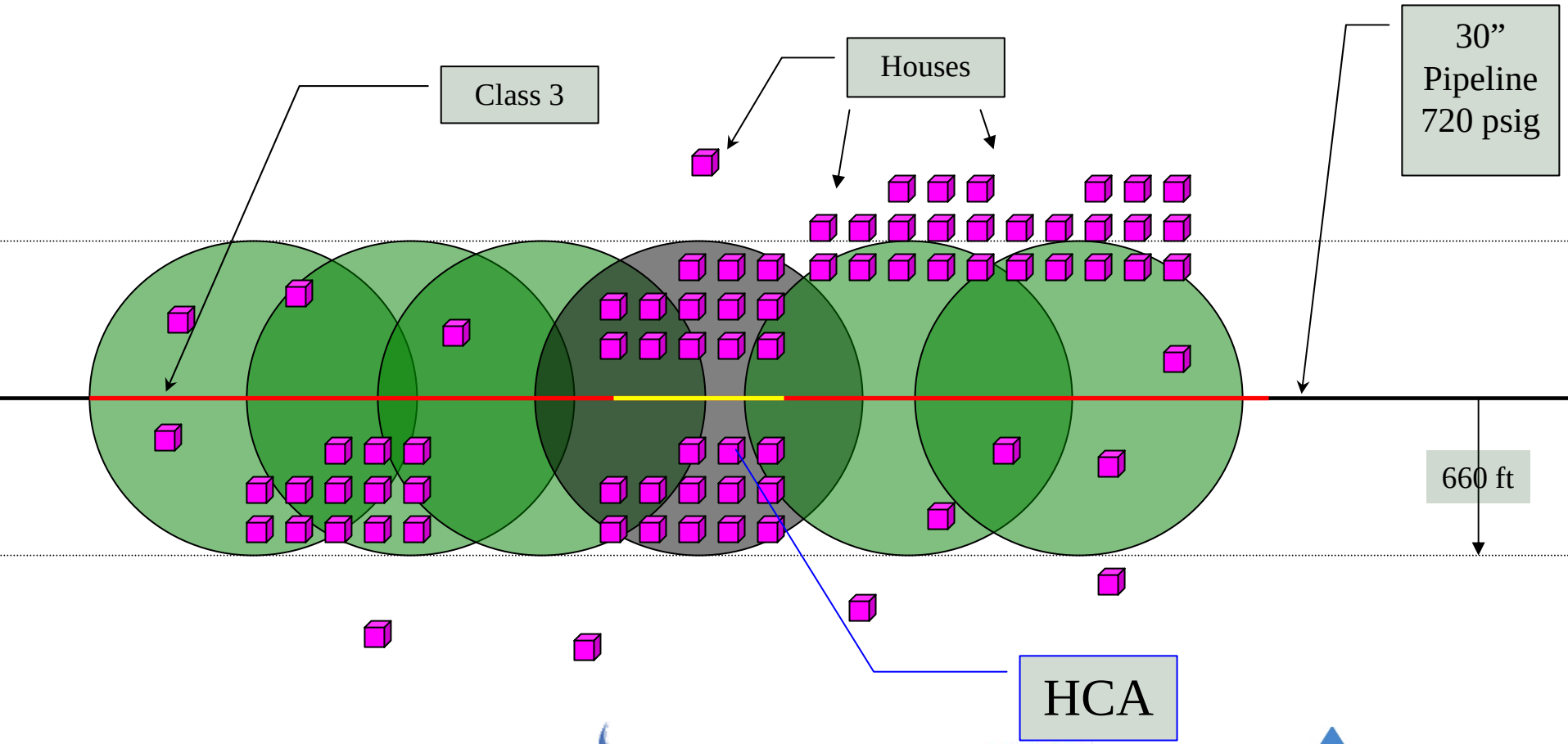
3. Pipeline Integrity Management (IM)

IM Principles

- **Gas IM**
  - **Design Factors based on Class Location**
  - **HCA Definitions, including Identified Sites**
  - **Integrity Assessments**

Liquid IM

Pictorial of a High Consequence Area for Natural Gas Overlaid on The Present Class Location System



Source: 2000 INGAA Proposal

IMP = Manage Time Dependent Effects

- Manage Time Independent Effects
  - Excavation Damage Prevention Understanding
    - 1st Party
    - 2nd Party
    - 3rd Party
  - One Call Programs
  - Common Ground Alliance (CGA)
  - Excavation Damage Prevention Initiative (EDPI)
  - Pipeline Easement Management
  - Local Government Practices

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Integrity Assessments *(example: natural gas transmission pipelines)*

Table 3
2004 – 2006 PHMSA Integrity Management Metrics

PHMSA METRIC Onshore & Offshore Pipelines	2004	2005	2006
Total Onshore & Offshore Gas Transmission Miles	296,740	295,613	288,765
Total Miles Inspected	30,398	19,669	19,765
Miles of HCA Pipe	21,727	20,116	18,830
HCA Miles Inspected	3,956	2,739	3,406
Number of Immediate Repairs in HCAs	101	237	158
Number of Scheduled Repairs in HCAs	595	403	405
Number of Leaks in HCAs	117	105	86
Number of Failures in HCAs	8	20	11
Number of Incidents in HCAs			
Time Dependent	2	0	1
Time Independent	5	8	7
Stable	1	2	3

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3. Pipeline Integrity Management (IM)

IM Principles

Gas IM

- **Liquid IM**
  - **HCA Definition**
  - **Integrity Assessments**

Integrity Assessment Regulations

- The federal pipeline integrity management regulations for hazardous liquid pipelines (§195.452) and natural gas pipelines (§192.901- §192.951) require operators to perform risk assessments of their pipelines to:
- Ensure that integrity assessment methods (internal inspection, pressure testing, direct assessment, etc.) are employed to address significant threats on pipeline segments.
- Ensure that assessments of threats and potential consequences are conducted

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Integrity Assessment Regulations

- An operator's Integrity Management Program must include the following elements:
  - a process for determining which pipeline segments could affect an HCA,
  - a Baseline Assessment Plan,
  - a process for continual integrity assessment and evaluation,
  - an analytical process that integrates all available information about pipeline integrity and the consequences of a failure,
  - repair criteria to address issues identified by the integrity assessment method and data analysis,
  - a process to identify and evaluate preventive and mitigative measures to protect HCAs,
  - methods to measure the integrity management program's effectiveness, and
  - a process for review of integrity assessment results and data analysis by a qualified individual.

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HCA Definition *(example: hazardous liquid pipelines)*

- IM provides enhanced protection for defined High Consequence Areas (HCAs) which have been mapped by PHMSA and made available to industry. HCAs include:
  - unusually sensitive environmental areas (defined in 195.6),
  - urbanized areas and other populated places (delineated by the Census Bureau), and
  - commercially-navigable waterways.

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Identification of HCAs in IM

- Hazardous liquid pipeline operators must develop a written Integrity Management Program that includes:
  - Identification of all pipeline segments that could affect an HCA
  - A Baseline Assessment Plan to assure integrity of these segments,
  - A Framework that identifies how each element of the Integrity Management Program will be implemented.

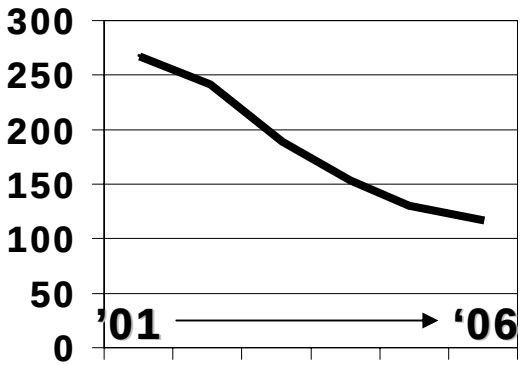
Integrity Assessments *(example: hazardous liquid pipelines)*

- U.S. mileage – 165,000 miles
- “Could affect” HCAs – 72,000 miles
- 50% of inspections completed at half way point in Sept 2004
- 100% of inspections to be completed by March 2008
- Industry has inspected more and repaired more than necessary

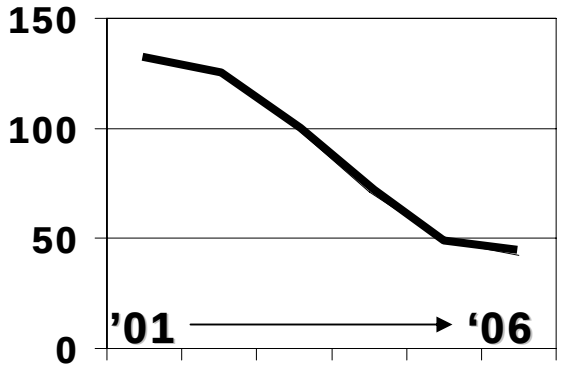
PPTS Onshore Pipe Incidents, '99-'06

3-Yr Average Ending Year Shown

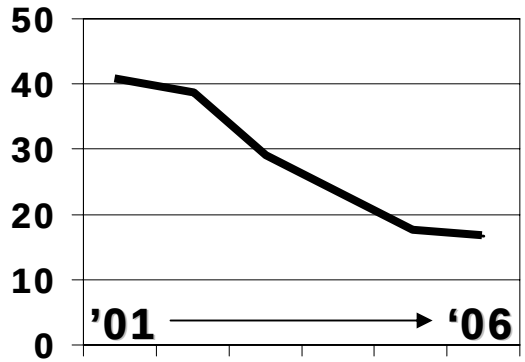
TOTAL, ALL CAUSES



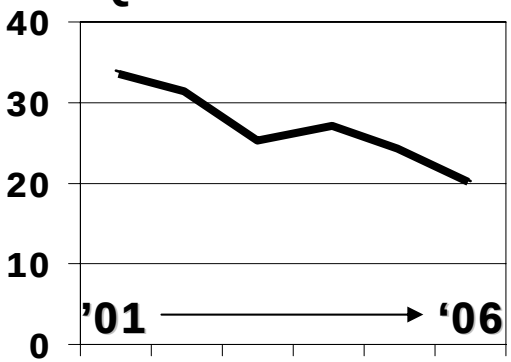
CORROSION



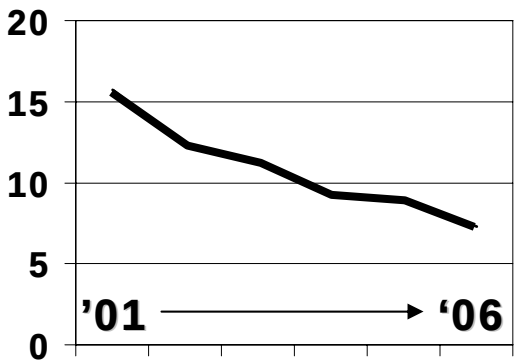
THIRD PARTY



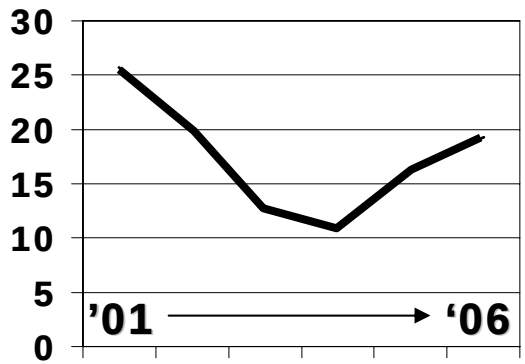
EQUIP./NON-PIPE



OPERATOR/OPER'N



MAT'L/SEAM/WELD



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4. Pipeline Economics

Economic Regulation of Oil Pipelines

- Oil pipelines are regulated as Common Carriers Under the Interstate Commerce Act
- Rates are set by four methods
  - ✓ Indexation – rates changed annually at index approved by FERC every five years
  - ✓ Market-based
  - ✓ Settlement/Negotiated
  - ✓ Cost-of-service

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Economic Regulation of Natural Gas Pipelines

- Interstate natural gas pipelines are regulated as Open Access under Natural Gas Act
- Interstate natural gas pipelines are regulated by individual State Public Utility Commisions
- Rates are set by four methods
  - ✓ Cost-of-service
  - ✓ Settlement/Negotiated
  - ✓ Market-based

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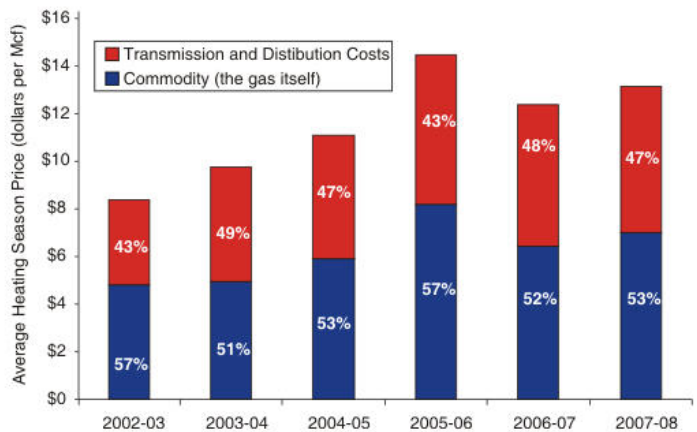
Pipelines – Key Economic Facts

- Oil Pipelines are the only economically regulated segment of the petroleum industry within the entire petroleum value chain – from oil field to end user
- Oil pipelines handle 17% of nation's freight for 2% of the cost
- Gas Pipelines are the only economically regulated segment within the entire natural gas value chain – from gas field to end user

Figure 1. Breakdown of Natural Gas Price Paid by Residential Consumers During the Heating Season, 2002-2008



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Depth of Cover requirement for proximity to buildings

§ 195.210 Pipeline location.

(a) Pipeline right-of-way must be selected to avoid, as far as practicable, areas containing private dwellings, industrial buildings, and places of public assembly.

(b) No pipeline may be located within 50 feet (15 meters) of any private dwelling, or any industrial building or place of public assembly in which persons work, congregate, or assemble, unless it is provided with at least 12 inches (305 millimeters) of cover in addition to that prescribed in §195.248.

Depth of Cover requirement

Location	Cover inches (millimeters)	
	For normal excavation	**For rock excavation[1]**
Industrial, commercial, and residential areas	36 (914)	30 (762)
Crossing of inland bodies of water with a width of at least 100 feet (30 millimeters) from high water mark to high water mark	48 (1219)	18 (457)
Drainage ditches at public roads and railroads	36 (914)	36 (914)
Deepwater port safety zones	48 (1219)	24 (610)
Gulf of Mexico and its inlets in waters less than 15 feet (4.6 meters) deep as measured from mean low water	36 (914)	18 (457)
Other offshore areas under water less than 12 ft (3.7 meters) deep as measured from mean low water	36 (914)	18 (457)
Any other area	30 (762)	18 (457)