Excavation Damage Prevention

Florida Public Service Commission
Natural Gas Pipeline Safety Seminar

February 7 and 8, 2012

Arthur O. Buff, P.E.
CATS Program Manager
PHMSA, Southern Region
• What is PHMSA?
• Incident Causes Statistics
• Excavation Incidents
• PIPES and PSRCJC Acts and Proposed Regulations
• Damage Prevention Programs
• Information Sources
Mission: To ensure the safe, reliable, and environmentally sound operation of the Nation's pipeline transportation system.
<table>
<thead>
<tr>
<th>Pipeline Type</th>
<th>Mileage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Distribution</td>
<td>25,291</td>
<td>82.5%</td>
</tr>
<tr>
<td>Gas Transmission</td>
<td>4,871</td>
<td>16%</td>
</tr>
<tr>
<td>Gas Gathering</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Hazardous Liquid</td>
<td>475</td>
<td>1.5%</td>
</tr>
<tr>
<td>Total</td>
<td>30,637</td>
<td>100%</td>
</tr>
<tr>
<td>Pipeline Type</td>
<td>Significant Incidents</td>
<td>Fatalities</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Gas Transmission</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Gas Distribution</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>29</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>
ALL PIPELINES
SIGNIFICANT INCIDENTS (1991 - 2010)

Serious Incident Cause Breakdown
National, All Pipeline Systems, 1991-2010

- CORROSION
- EXCAVATION DAMAGE
- INCORRECT OPERATION
- MAT'L/WELD/EQUIP FAILURE
- NATURAL FORCE DAMAGE
- OTHER OUTSIDE FORCE DAMAGE
- ALL OTHER CAUSES

Source: PHMSA Significant Incidents Files December 30, 2011
HAZARDOUS LIQUID PIPELINES
SIGNIFICANT INCIDENTS (1991 - 2010)

Significant Incident Cause Breakdown
National, Hazardous Liquid, 1991-2010

- Corrosion: 23.7%
- Excavation Damage: 19.5%
- Incorrect Operation: 19.7%
- Material/Weld/Equipment Failure: 4.8%
- Natural Force Damage: 2.9%
- Other Outside Force Damage: 1.8%
- All Other Causes: 7.6%

Source: PHMSA Significant Incidents Files December 30, 2011
GAS TRANSMISSION PIPELINES
(1991 - 2010)

Significant Incident Cause Breakdown
National, Gas Transmission, 1991-2010

- 23.0% CORROSION
- 18.3% EXCAVATION DAMAGE
- 18.2% INCORRECT OPERATION
- 11.9% MAT'L/WELD/EQUIP FAILURE
- 21.5% NATURAL FORCE DAMAGE
- 5.1% OTHER OUTSIDE FORCE DAMAGE
- 2.0% ALL OTHER CAUSES

Source: PHMSA Significant Incidents Files December 30, 2011
GAS DISTRIBUTION PIPELINES
SIGNIFICANT INCIDENTS (1991 - 2010)

Source: PHMSA Significant Incidents Files December 30, 2011
ALL PIPELINES IN FLORIDA, INCIDENT CAUSE BREAKDOWN (2001 - 2010)

All Reported Incident Cause Breakdown
Florida, All Pipeline Systems, 2001-2010

- CORROSION: 15.8%
- EXCAVATION DAMAGE: 34.2%
- INCORRECT OPERATION: 23.7%
- MAT'L/WELD/EQUIP FAILURE: 13.2%
- NATURAL FORCE DAMAGE: 5.3%
- OTHER OUTSIDE FORCE DAMAGE: 7.9%
- ALL OTHER CAUSES:

Source: PHMSA Significant Incidents Files December 30, 2011
GAS TRANSMISSION PIPELINES IN FLORIDA INCIDENT CAUSE BREAKDOWN (2001 - 2010)

All Reported Incident Cause Breakdown
Florida, Gas Transmission, 2001-2010

- Corrosion: 6.3%
- Excavation Damage: 25.0%
- Incorrect Operation: 12.5%
- Material/Weld/Equipment Failure: 25.0%
- Natural Force Damage: 25.0%
- Other Outside Force Damage: 6.3%
- All Other Causes: 6.3%

Source: PHMSA Significant Incidents Files December 30, 2011
GAS DISTRIBUTION PIPELINES IN FLORIDA INCIDENT CAUSE BREAKDOWN (2001 - 2010)

All Reported Incident Cause Breakdown
Florida, Gas Distribution, 2001-2010

- Excavation Damage: 61.5%
- Corrosion: 7.7%
- Incorrect Operation: 7.7%
- Material/Weld/Equipment Failure: 23.1%
- Natural Force Damage
- Other Outside Force Damage
- All Other Causes

Source: PHMSA Significant Incidents Files December 30, 2011
SIGNIFICANT INCIDENTS CAUSED BY EXCAVATION DAMAGE (2002 thru 2006)

• Gas Distribution Pipelines
  ▪ 37% of Significant Incidents
  ▪ 28% of Fatalities; 32% Injuries

• Gas Transmission Pipelines
  ▪ 13% of Significant Incidents
  ▪ 80% of Fatalities; 23% Injuries

• Liquid Pipelines
  ▪ 14% of Significant Incidents
  ▪ 63% of Fatalities; 16% Injuries
WHAT DO WE KNOW ABOUT EXCAVATION DAMAGE?

- Excavation damage is a serious threat to public safety and pipeline integrity
- Data indicates downward trend
  - gas transmission incidents
  - gas distribution incidents
- Excavation damage is preventable
- We can do more

Did I just hit a high pressure gas line??
ARE YOU SURE THERE ARE NO BURIED PIPELINES??

Hey Doc, did you call 811!
Edison, NJ - March 23, 1994

- 36” Natural gas transmission line operating at 970 psig ruptured
- Force of escaping gas around pipe ignited
- Several apartment buildings burned
- Investigation found “teeth marks” on pipeline
- $25 million property damage
• **Bellingham, WA - June 10, 1999**
  • 16” Gasoline pipeline leaked into a creek in a city park and stretched for 1 ½ miles
  • 1 ½ hours after leak started, gasoline ignited
  • 3 fatalities, 8 injuries
  • $45 million in property damage
  • Leak caused by damage to pipeline during 1994 water treatment plant construction (operator failed to identify or repair)
Appomattox, VA - September 14, 2008

- 30” 1955 Vintage natural gas transmission line ruptured, ignited, and burned, for 45 minutes
- 32’ft section of pipe ripped from the ground at the failure site
- 5 people were injured and 23 families were evacuated
- 2 homes destroyed and others damaged
- Investigation found 40% pipe wall loss due to external corrosion
- Property and other losses totaled over $3 million dollars
Georgia - 2011
8” Liquid propane gas line ruptured and explosion
1 person killed.
1 person injured, frostbite burns
Double wide mobile home, jeep, bulldozer and 20 acres of woodland were destroyed
50 firefighters battled fire for 5 hours
CIVICS 101 - HOW GOV’T WORKS

CONGRESS

PHMSA

Office of Pipeline Safety

Pipeline Safety Regulations

49 U.S.C.

49 CFR §1.53

Delegates

Law

Reg
Pipeline Safety, Regulatory Certainty and Job Creation Act of 2011 (PSRCJC)

Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006 (PIPES)

Pipeline Safety Improvement Act of 2002 (PSIA)
49 CFR 192.101(b)(1)(ii)
(Part 192: Subparts A thru P)
CURRENT PHMSA REGULATIONS

Parts 186 to 199
Revised as of October 1, 2011

Part 192
Transportation of natural and other gas by pipeline
Benefits

✓ Decreased excavation damage
✓ Enhanced public safety
✓ Preservation of the environment
✓ Improved pipeline system performance
✓ Improved relationships with affected public
✓ Less resistance to pipeline activities
Pipeline operators must have written programs to prevent damage from excavation activities.

What are “excavation activities”?  
- Excavation  
- Blasting  
- Boring  
- Tunneling  
- Backfilling  
- Removal of aboveground structures by explosive or mechanical means  
- Other earthmoving operations
Operators must Participate in “qualified one-call system”

- State adopted one-call damage prevention program (49 CFR 198.37) or
- One-call operated in accordance with 49 CFR 198.39
- Provides operator management responsibilities
- Assesses operator proportional fee to cover one-call costs

Operators Damage Prevention Program must:

- Identify on current basis person(s) who engage in excavation activities in area pipeline located
- Provide for notification of public near pipeline and above person(s) as often as needed:
  - program’s existence and purpose
  - how to learn location of pipeline before excavation begins
Operators Damage Prevention Program must:

- Provide means of receiving and recording notification of planned excavation
- Notify persons who give notice of intent to excavate, type of temporary markings and how to identify
- Provide for temporary marking of pipelines in area of excavation as far in advance as practicable
- Monitor/inspect pipeline during and after excavation activity as needed
- Operators face civil penalties for non-compliance
Sec. 2 – Pipeline Safety and Damage Prevention:

- Use applicable State one call system before excavation activities

- Not disregard operator’s location information or markings (Operators are subject to civil action and penalties for failure to promptly respond to location requests)

- Promptly report damage to pipeline facility operator and call 911 if liquids or gas escapes
It appears PHMSA might need to do some rulemaking!

Limited Authority

PHMSA cannot enforce against excavators until it publishes rules on how to evaluate a state's damage prevention program and only if the state's enforcement program is inadequate!
• Effective, balanced enforcement reduces excavation damages to pipelines
  ▪ State data supports this

• Enforcement responsibility is inherently a State responsibility

• Enforcement is only one aspect of effective damage prevention programs
Section 3, Pipeline Damage Prevention

(a) To qualify for a grant, State one-call programs, as a minimum, must provide for:

- Appropriate participation by all underground facility operators (includes gov’t)
- Appropriate participation by all excavators
- Flexible/effective enforcement under State law (participation in and use of one-call systems)
(b) State Damage Prevention Programs

• No exemptions to municipalities, State agencies or their contractors from one-call requirements of program

• DOT will conduct study (*report to Congress < 2 yrs.*); impact of excavation on pipeline safety:
  
  A. Analyze frequency/severity of different types of excavation damage incidents
  B. Analyze exemptions to State one-call requirements
  C. Compare above (B) to (A)
  D. Analyze potential safety benefits and adverse consequences of eliminating all exemptions for mechanized excavation from State one-call
NINE ELEMENTS OF EFFECTIVE DAMAGE PREVENTION PROGRAM

PIPES Act of 2006, 60134(b)(1) through (9):
(CGA Best Practices, Version 5.0 March 2008)

1. Enhanced communication between operators and excavators
2. Fostering support and partnership of all stakeholders
3. Operators’ use of performance measures for locators
4. Partnership in employee training: operators, excavators, locators
5. Partnership in public education and outreach
6. Enforcement Agencies’ role to help resolve issues
7. Fair and consistent enforcement of the law
8. Use of technology to improve the locating process
9. Data analysis to continually improve program effectiveness
KEY POINTS IN CONSIDERING NINE ELEMENTS

• Damage prevention is a multi-faceted issue

• Damage prevention is a shared responsibility, but damage prevention is largely executed at State and local levels

• There is considerable variability between the provisions of State damage prevention laws and programs. One size does not fit all

• Damage prevention decisions should be based on experience and data in each State
What is SDPPC?

• Questions for states concerning damage prevention programs
• Evaluation of state programs against 9 elements
• Discussions with stakeholders in each state
• Consumer-reports style depiction of results

What is SDPPC Goal?

• Understanding state damage prevention programs, share results, foster improvement at state level
PHMSA SDPPC initiative: Evaluated state programs against 9 elements

- **Largely implemented program**
- **Not implemented, needs to be addressed**
- **Partially implemented, actions underway or planned for improvements**

1 2 3 4 5 6 7 8 9
Element 1: “Participation by operators, excavators, and other stakeholders in the development and implementation of methods for establishing and maintaining effective communications between stakeholders from receipt of an excavation notification until successful completion of the excavation, as appropriate.”
Element 2: “A process for fostering and ensuring the support and partnership of stakeholders, including excavators, operators, locators, designers, and local government in all phases of the program.”
Element 3 – Operator’s Use of Performance Measures for Locators*

- Largely implemented program element
- Partially implemented or not fully developed program element; actions are underway or planned for improvements
- Program element is not implemented and needs to be addressed
- Element partially implemented/marginally effective program element needs improvement; no actions underway/planned for improvement
- No information available or not applicable

*Element 3: “A process for reviewing the adequacy of a pipeline operator’s internal performance measures regarding persons performing locating services and quality assurance programs.”
*Element 4: “Participation by operators, excavators, and other stakeholders in the development and implementation of effective employee training programs to ensure that operators, the one call center, the enforcing agency, and the excavators have partnered to design and implement training for the employees of operators, excavators, and locators.”
Element 5 – Partnership in Public Education*

Legend:
- **Green**: Largely implemented program element
- **Lavender**: Partially implemented or not fully developed program element; actions are underway or planned for improvements
- **Red**: Program element is not implemented and needs to be addressed
- **Pink**: Element partially implemented/marginally effective program element needs improvement; no actions underway/planned for improvement
- **Gray**: No information available or not applicable

*Element 5: “A process for fostering and ensuring active participation by all stakeholders in public education for damage prevention activities.”*
Element 6: “A process for resolving disputes that defines the State authority’s role as a partner and facilitator to resolve issues.”
Element 7 - Fair and Consistent Enforcement of the Law

- Largely implemented program element
- Partially implemented or not fully developed program element; actions are underway or planned for improvements
- Program element is not implemented and needs to be addressed
- Element partially implemented/marginally effective program element needs improvement; no actions underway/planned for improvement
- No information available or not applicable

*Element 7: “Enforcement of State damage prevention laws and regulations for all aspects of the damage prevention process, including public education, and the use of civil penalties for violations assessable by the appropriate State authority.”*
Element 8 – Use of Technology to Improve the Locating Process

- **Largely implemented program element**
- **Partially implemented or not fully developed program element; actions are underway or planned for improvements**
- **Program element is not implemented and needs to be addressed**
- **Element partially implemented/marginally effective program element needs improvement; no actions underway/planned for improvement**
- **No information available or not applicable**

*Element 8: “A process for fostering and promoting the use, by all appropriate stakeholders, of improving technologies that may enhance communications, underground pipeline locating capability, and gathering and analyzing information about the accuracy and effectiveness of locating programs.”*
Element 9: “A process for review and analysis of the effectiveness of each program element, including a means for implementing improvements identified by such program reviews.”
## SUMMARY OF DAMAGE PREVENTION

### REVIEW OF STATE LAW/REGULATIONS

Select a Category:
- Excavator
- Operator
- Other

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavator Notice to One Call Required</td>
<td>Yes/No</td>
</tr>
<tr>
<td>White-Line Required</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Hand Dig / Vacuum Excavate within Tolerance Zone</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Preserve / Maintain Marks Required</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Call Again if no Response from Operator or Signs of Unmarked Facilities</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Re-Notification Required</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Special Language Re Trenchless Technology</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Non-Delegable Duty</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Notify Operator of Damage Required</td>
<td>Yes/No</td>
</tr>
</tbody>
</table>

**Alabama**
- Excavator Notice to One Call Required: Yes
- White-Line Required: Yes
- Hand Dig / Vacuum Excavate within Tolerance Zone: Yes
- Preserve / Maintain Marks Required: Yes
- Call Again if no Response from Operator or Signs of Unmarked Facilities: Yes
- Re-Notification Required: Yes
- Special Language Re Trenchless Technology: Yes
- Non-Delegable Duty: Yes
- Notify Operator of Damage Required: Yes

**Ticket Life (# of days):** 14

**White-Line Required:** Yes

**Tolerance Zone:** 18”

**Special Digging Requirements within Tolerance Zone:**
- Employ detection equipment or non-invasive methods to determine the precise location of an operator's underground facilities when excavation...

Third Party Excavation Enforcement

ANPRM – PIPELINE DAMAGE PREVENTION PROGRAMS

Current Status:
ANPRM in FR Oct 29, 2009
Waiting OMB NPRM approval; Feb. 2012?

Objective: ANPRM allows PHMSA to seek feedback and comments regarding the development of criteria and procedures to determine the adequacy of state damage prevention laws

Goal: Encourage states to strengthen their excavation damage prevention laws and adequately enforce those laws
• PHMSA publishes a Notice of Proposed Rulemaking (NPRM)

• NPRM will contain responses to all comments received on the ANPRM and proposed regulatory language

• Excavators and other affected parties will have more opportunity to provide input to the rule after the NPRM is published
Keep it simple

• Clearly define what is expected of state enforcement programs to be considered adequate

• Minimize exemptions (but some do make sense)

• Enforcement must be balanced – excavators as well as facility owners must be accountable

For more information, go to this web page: http://www.regulations.gov
Key word or docket ID: PHMSA-2011-0023
FEDERAL DAMAGE PREVENTION
ENFORCEMENT INFORMATION

http://www.phmsa.dot.gov/pipeline/regs/rulemaking
ADDENDUM INFORMATION AT PHMSA DAMAGE PREVENTION WEBSITE

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