

# *The Oil Pipeline Industry Had an Idea . . .*

## *Learning from PPTS 1999-2007*

### Understanding Hazards

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President

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A Presentation to

**Pipeline Safety – What More Needs To Be Done?**

*A conference sponsored by The Pipeline Safety Trust*

Consequences

Improving Performance

Spills

Deaths

Injuries

Error-Free Operations

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# *What is the Pipeline Performance Tracking System?*

- ✱ **“PPTS”**: voluntary; open to all liquids pipeline operators
- ✱ **No membership req’d, no fee imposed**
- ✱ **Industry-run and maintained**
- ✱ **Collecting info since 1999**
- ✱ **Records spills of 5 gallons or more on land, all spills to water (compare old OPS @ 50 barrels)**
- ✱ **In 2007, PPTS participants operated about 85% of OPS miles and total barrel-miles**

***1. Measure 2. Learn 3. Manage 4. Improve***

# Data Mining Highlights

- ✱ **Team Composed of Diverse Subject Matter Experts**
- ✱ **Operator Advisories ([www.api.org/ppts](http://www.api.org/ppts))**
  - ➔ Causes/locations with a large share
  - ➔ Consequences
  - ➔ New perspective via PPTS
  - ➔ Guidelines for reporting
  - ➔ FAQs for consistency
- ✱ **Reports and Fact Sheets**
- ✱ **Also, Performance Excellence Team**



**The data doesn't go in and not come out!**

## *PPTS Participants Use PPTS*

- ✱ **To measure operator/Industry performance**
- ✱ **To allocate \$**
  - ✓ Maintenance
  - ✓ IMP
  - ✓ R&D
- ✱ **To direct regulatory/advocacy effort**
- ✱ **To find new approaches to keeping people and communities safe**

# *Key Elements in PPTS Success*

## ☀ **Commitment**

- Pipeline Leadership
- API/AOPL

## ☀ **Care and Feeding (API's Commitment)**

- QC: Transparency, credibility
- Program Software/Mechanics
- Data Mining Team

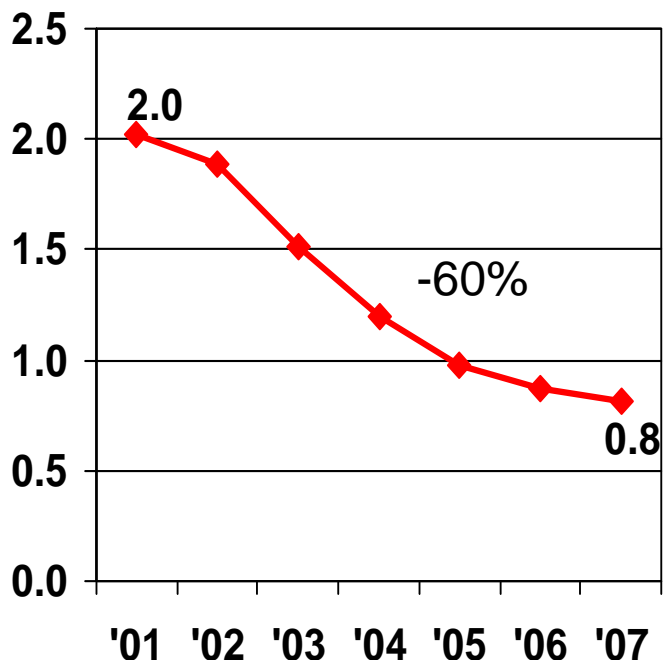
## ☀ **Learning**

- Data Mining Team
- Lectures
- Website

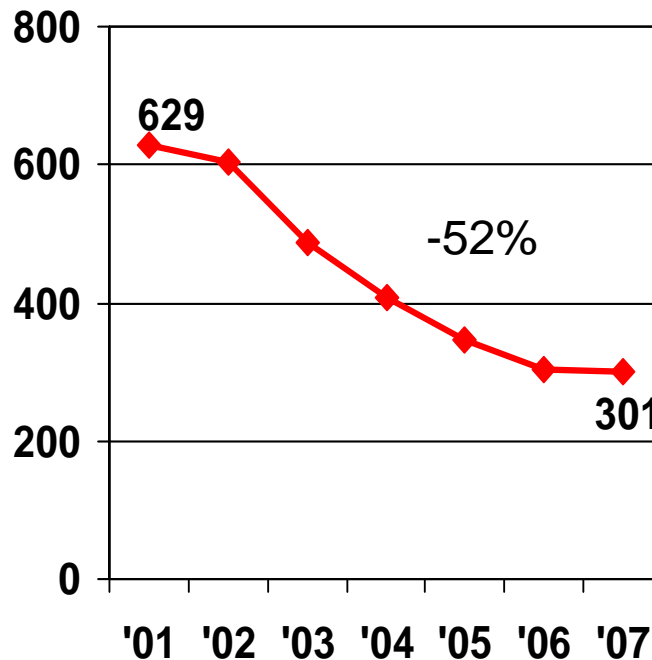
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# *Dramatic Improvement: Liquids Pipeline Industry Onshore Pipe Spill Record*

**Number of Spills per 1,000 Miles**



**Barrels Released per 1,000 Miles**

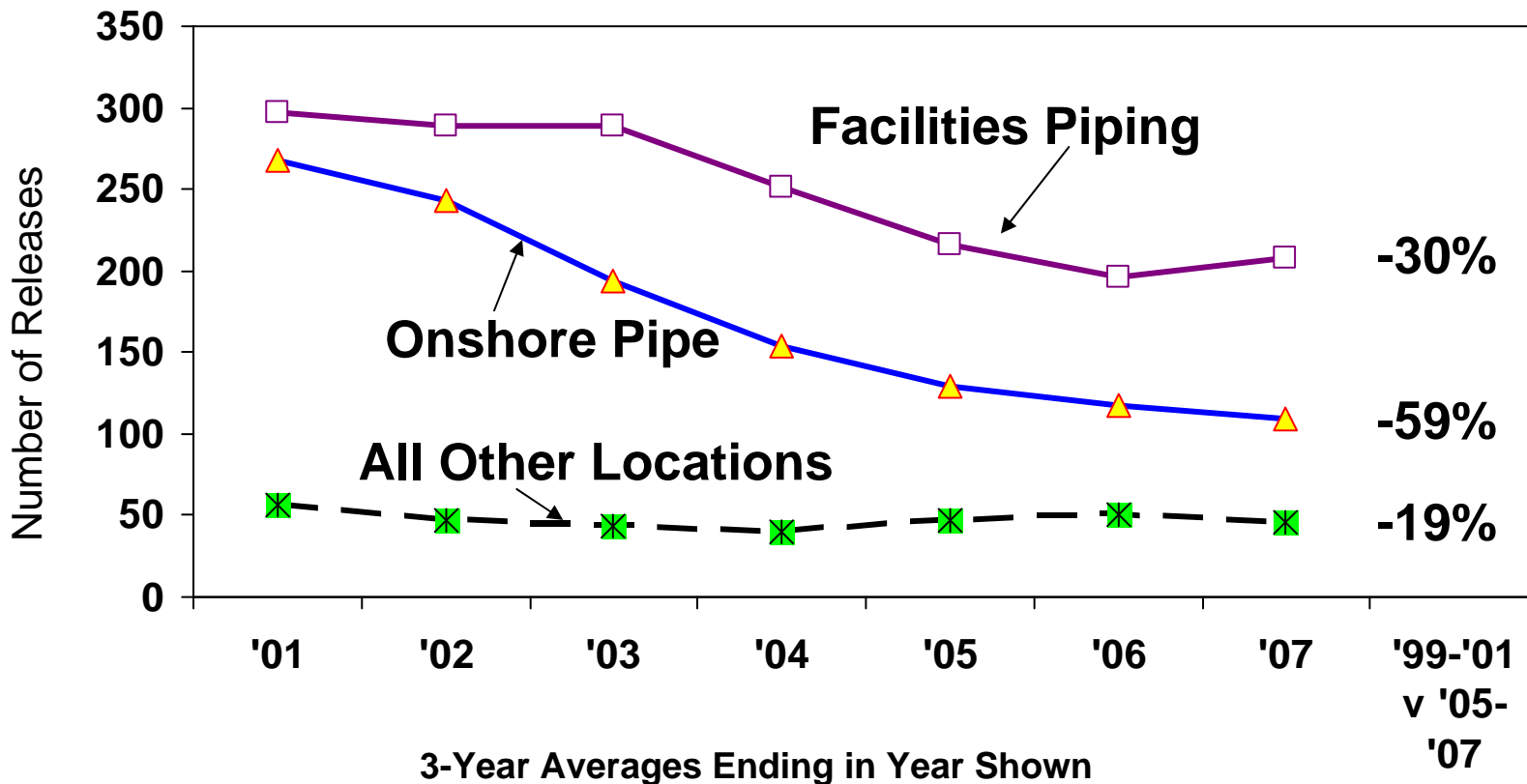


**3-Year Averages Ending in Year Shown**

Source: Pipeline Performance Tracking System, a voluntary spill reporting system involving 85% of the U.S. liquids pipeline mileage. Percentage decline from 1999-2001 average to 2005-2007 average.

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# Releases along the right-of-way have fallen by almost 60%



All other locations: tanks, caverns, offshore pipe  
Source: Pipeline Performance Tracking System, 1999-2007.

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## *System location and risk*

*Facilities piping: more of them, but small*  
*Onshore pipe: fewer of them, but larger*

**Incidents by System Locations, 1999-2007**

|  | <b>Number</b> | <b>Barrels</b> |
|--|---------------|----------------|
| <b>Total (annual average, 1999-2007)</b> | <b>476</b>    | <b>90,983</b>  |
| <b>Share of Total</b>                    |               |                |
| <b>Facilities piping</b>                 | <b>53%</b>    | <b>14%</b>     |
| <b>Onshore pipeline</b>                  | <b>37%</b>    | <b>65%</b>     |
| <b>Aboveground Storage Tank</b>          | <b>8%</b>     | <b>18%</b>     |
| <b>Offshore pipeline</b>                 | <b>2%</b>     | <b>2%</b>      |
| <b>Cavern</b>                            | <b>0%</b>     | <b>0%</b>      |

Includes releases due to hurricanes Ivan, Katrina and Rita.  
Source: Pipeline Performance Tracking System

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# Where Are People Getting Hurt or Killed? Deaths and Injuries by System Part

|                   | System Part              | Incidents<br>(#, '99-'07) | Empl.    | Contr.<br>(# People) | Other     | Total     |
|-------------------|--------------------------|---------------------------|----------|----------------------|-----------|-----------|
| <b>Fatalities</b> | Facilities Piping        | 1                         | 1        | 0                    | 0         | 1         |
|                   | Onshore Pipeline         | 8                         | 2        | 2                    | 12        | 16        |
|                   | <b>Grand Total</b>       | <b>9</b>                  | <b>3</b> | <b>2</b>             | <b>12</b> | <b>17</b> |
| <b>Injuries</b>   | Aboveground Storage Tank | 1                         | 1        | 0                    | 0         | 1         |
|                   | Cavern/belowground       | 1                         | 1        | 0                    | 0         | 1         |
|                   | Facilities Piping        | 3                         | 2        | 6                    | 0         | 8         |
|                   | Onshore Pipeline         | 16                        | 2        | 1                    | 30        | 33        |
|                   | <b>Grand Total</b>       | <b>21</b>                 | <b>6</b> | <b>7</b>             | <b>30</b> | <b>43</b> |

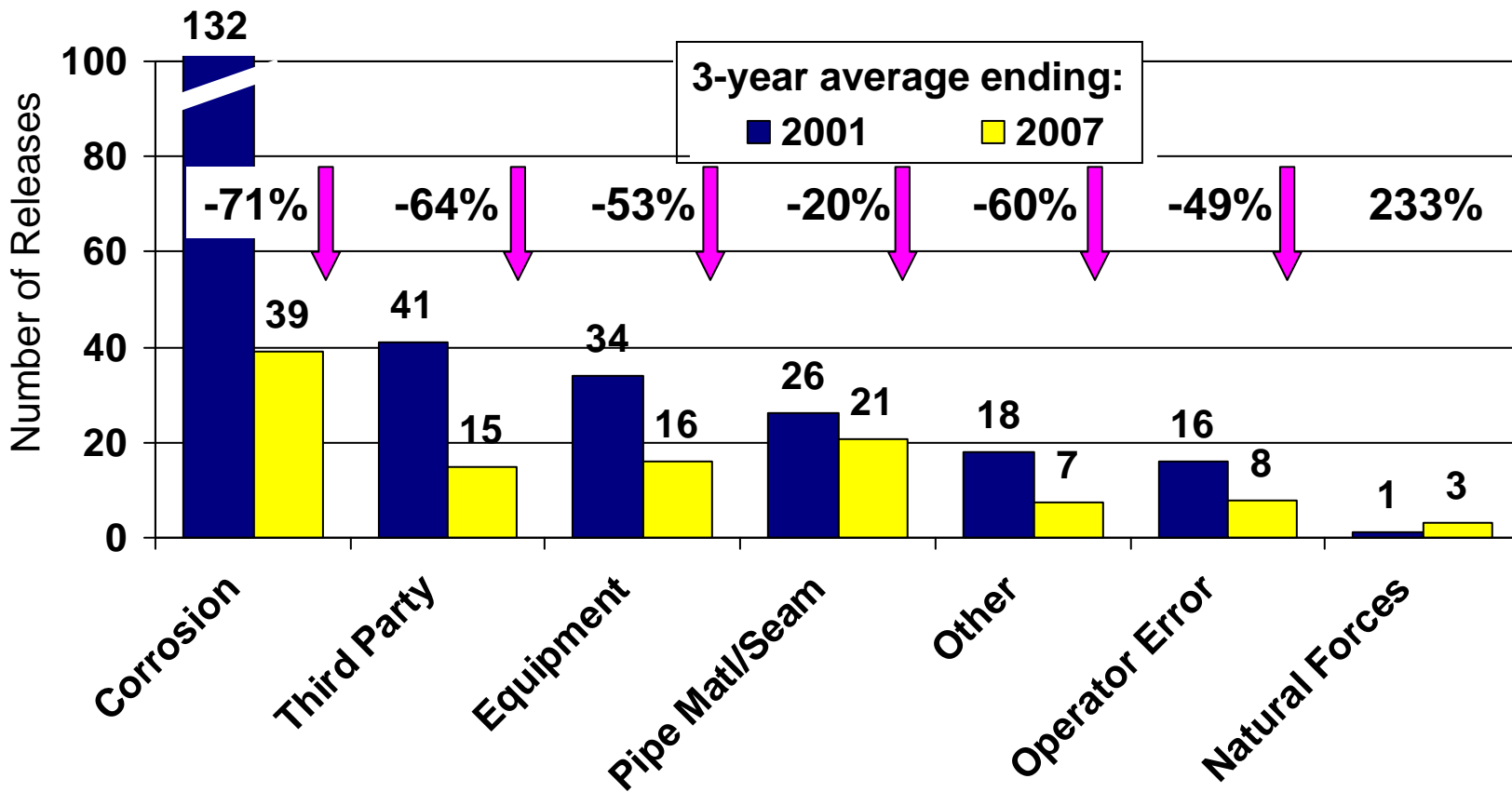
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# Assessing Consequences: Deaths and Injuries by Cause

|                   | Cause                                | Incidents<br>(#, '99-'07) | Empl.    | Contr.<br>(# People) | Other     | Total     |
|-------------------|--------------------------------------|---------------------------|----------|----------------------|-----------|-----------|
| <b>Fatalities</b> | Third Party Damage                   | 4                         | 0        | 0                    | 10        | 10        |
|                   | Operator Error                       | 2                         | 0        | 2                    | 0         | 2         |
|                   | Other                                | 3                         | 3        | 0                    | 2         | 5         |
|                   | <b>Total</b>                         | <b>9</b>                  | <b>3</b> | <b>2</b>             | <b>12</b> | <b>17</b> |
| <b>Injuries</b>   | Third Party Damage                   | 8                         | 0        | 0                    | 17        | 17        |
|                   | Operator Error (incl.<br>excavation) | 5                         | 4        | 6                    | 0         | 10        |
|                   | Pipe mat'l/seam                      | 2                         | 1        | 0                    | 2         | 3         |
|                   | Corrosion                            | 2                         | 0        | 0                    | 3         | 3         |
|                   | Equipment Malfunction                | 1                         | 0        | 0                    | 1         | 1         |
|                   | "Other failure" in a Tank            | 1                         | 1        | 0                    | 0         | 1         |
|                   | Other Cause                          | 2                         | 0        | 1                    | 7         | 8         |
| <b>Total</b>      | <b>21</b>                            | <b>6</b>                  | <b>7</b> | <b>30</b>            | <b>43</b> |           |

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# Reduction in releases along the right-of-way reflects diverse strategies



Source: Pipeline Performance Tracking System, a voluntary spill reporting system involving 85% of the U.S. liquids pipeline mileage

## *Focus on Corrosion*

- ✱ **Largest cause of ROW spills (46%)**
- ✱ **Reduced by 71% between 1999 and 2007**
- ✱ **56% are less than 5 barrels**
- ✱ **More important in crude oil systems than in refined product systems**
- ✱ **Billions \$ of investment have reduced**
  - ➔ **Inspection and repair in high consequence areas**
  - ➔ **First 5-year cycle is completed**
  - ➔ **Re-inspection for 2<sup>nd</sup> cycle now begun**

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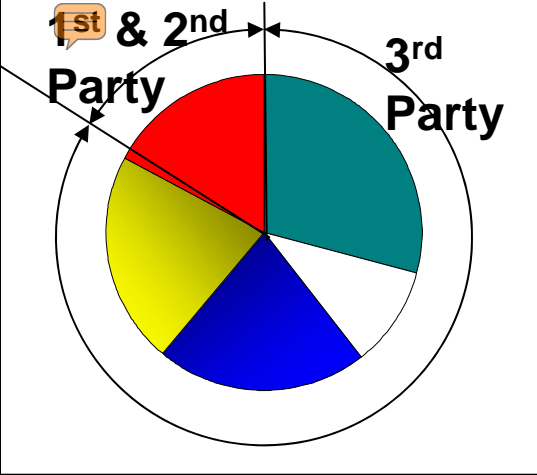
## *Focus on Third Party Damage*

- ✱ **"Third party" is someone other than the operator (first party) or its contractor (second party)**
- ✱ **Excavation or other mechanical damage**
- ✱ **Not the greatest number, but the highest consequence**
  - **Almost 90% occur along ROW**
  - **Deaths, injuries**
    - ✓ **10 of 17 fatalities on ROW due to third party damage**
    - ✓ **17 of 43 injuries on ROW due to third party damage**
  - **Large spills**
    - ✓ **15% of ROW number, but 38% of ROW volume**

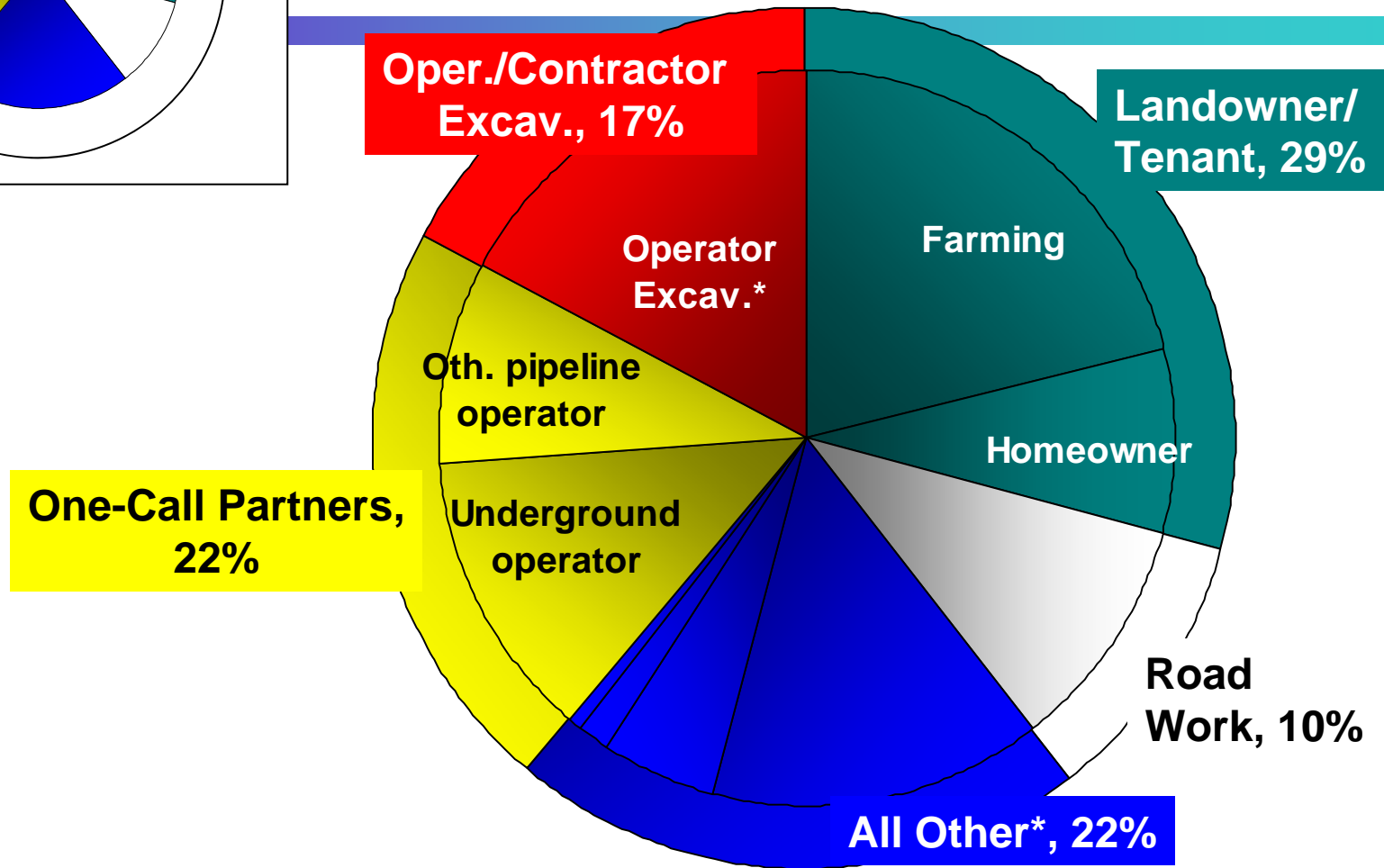
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## *Who are these "third parties"?*

- ✱ **Landowners (farmers, homeowners, tenants)**
- ✱ **Road construction crews**
- ✱ **Resid./comm'l development, etc.**
- ✱ **"One-call Partners" (pipelines and other underground utilities that pay for "call before you dig" systems)**
  
- ✱ **Can't forget first and second parties, though – the pipeline operator and its contractors**



# Who does the damage? Not just excavators

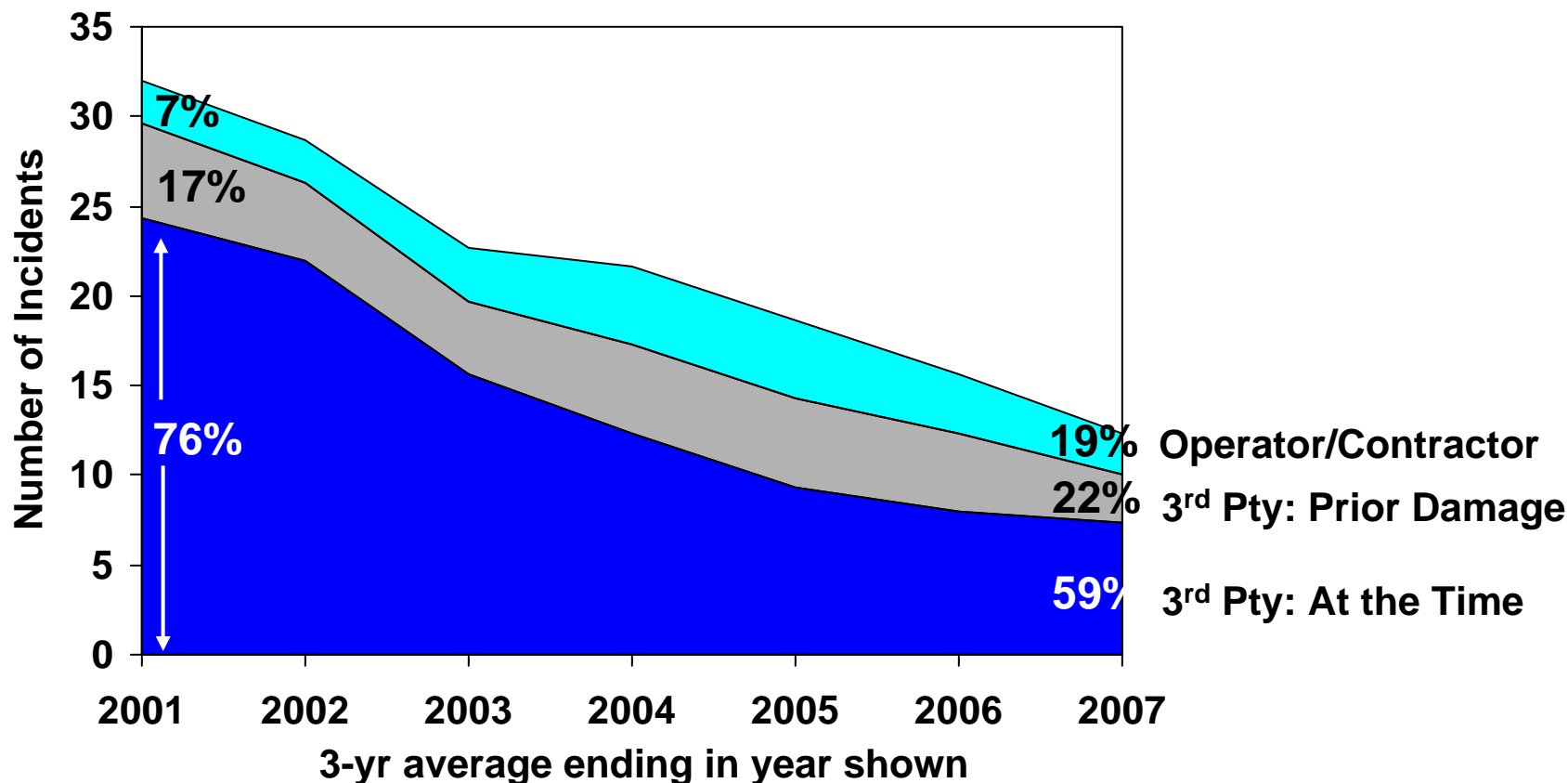


Onshore pipeline spills where: release occurred at the time of damage, and involving 5 barrels or more, or death, injury, fire or explosion.

Source: Pipeline Performance Tracking System, 1999-2007

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# 70% Decline in Third Party Hits Causing Immediate Failure

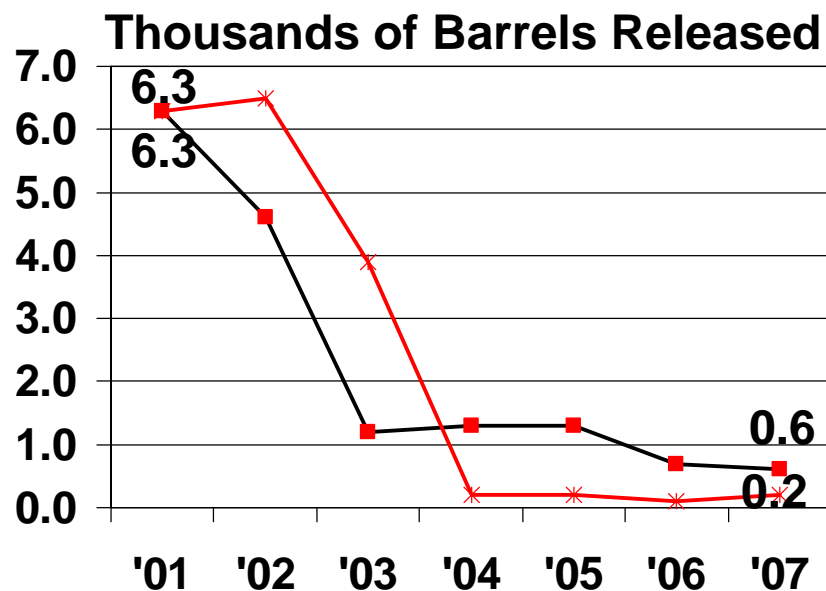
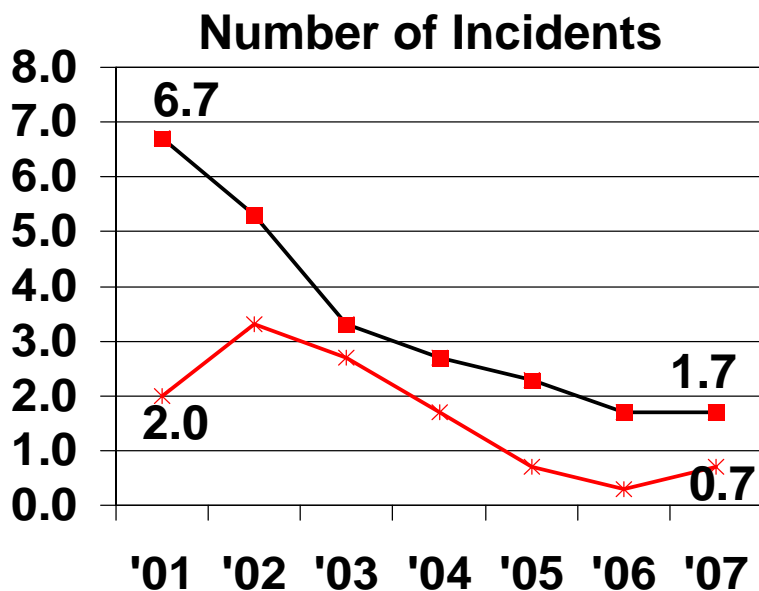


\* Includes onshore pipeline incidents  $\geq 5$  barrels or death, injury, fire or explosion

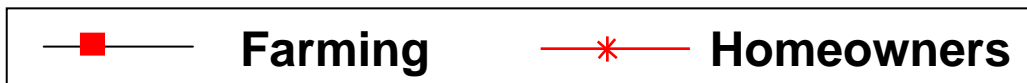
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# Example of Declines 1999-2007

## Incidents Caused by Landowner/Tenant Activity, 1999-2007



3-Yr. Averages ending in year shown



## *Recent Learnings: More detailed choices aid reporting*

### ☀ **Operator Error: more Other Human Error**

- **Survey: more root cause analysis? Better understanding?**
- **Yes. Old categories don't provide a good reporting path**
- **Revise PPTS to increase -- and improve – categories**
  - ✓ **Reporters don't have to puzzle over category -- faster**
  - ✓ **Better consistency from incident to incident and operator to operator**

*More detailed choices aid reporting (Facilities)*

- ✱ **Facilities incidents require details: “granularity”**
  - **Different pieces of equipment, different failure mechanisms**
  - **Diverse industry groups to advise**
  - **More surveys**
  - **Improved categories, plus sub-categories**
  - **PRCI report**

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## *Data Mining Team*

- ✱ **Bukky Adefemi (API)**
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- ✱ **Mark Brandon (Longhorn)**
- ✱ **Adrienne Cook (AOPL)**
- ✱ **Frank Gonzales – Lead (Buckeye)**
- ✱ **Tom Kelly (Colonial)**
- ✱ **Dave Knoelke (BP)**
- ✱ **Peter Lidiak (API)**
- ✱ **Guy Peltier (ExxonMobil)**
- ✱ **Debbie Price (Shell)**
- ✱ **Terry Riesen (Marathon)**
- ✱ **Matt Roberts (Chevron)**
- ✱ **Cheryl Trench (Allegro Energy Consulting)**
- ✱ **Todd Tullio (ConocoPhillips)**