

The petroleum pipeline industry has undertaken a voluntary environmental performance tracking initiative, recording detailed information about spills and releases, their causes and consequences.

The pipeline members of the American Petroleum Institute and the Association of Oil Pipe Lines believe that tracking and learning from spills will improve performance, thus demonstrating the industry's firm commitment to safety and environmental protection by its results.

This is one of a series of fact sheets about the Pipeline Performance Tracking System, "PPTS," its evolution and its lessons.

PPTS OPERATOR ADVISORY: HIGHLIGHTS OF PPTS FINDINGS, 1999-2004

Background

In 1999, the oil pipeline industry began collecting incident and infrastructure information in its Pipeline Performance Tracking System (PPTS). Operators voluntarily report spills of 5 gallons or more on land, all spills to water, and any incident deemed reportable to the U.S. Department of Transportation on PHMSA Form F 7000-1. In 2004, the operators participating in PPTS accounted for approximately 85% of the interstate oil pipeline mileage and throughput. The detailed incident record in PPTS remains confidential, but the data are cross-checked, compiled and analyzed so that operators may learn from releases and safety incidents, their causes and consequences. This narrative of the high-level findings has been prepared by the Data Mining Team, the industry committee that manages PPTS and analyzes its results. Historical PPTS information is shown in the graphs on page 4.

Highlights for 2004

- Spills from facilities piping – operator-controlled pump stations, metering sites and tank farms -- showed their first significant decline;
- Because operators improved their performance inside the facility fence, spills caused by equipment failures (non-pipe components such as valves, fittings and pumps) and operator error both showed their first significant declines;
- Corrosion spills continued to decline, led by declines in spills on crude oil systems;
- Other than the first-ranked cause, corrosion, the next leading causes of spills on onshore pipeline systems increased slightly in 2004, resulting in a flat year-to-year performance for onshore pipelines after 3 years of significant declines;
- After years of declines for both spills from crude oil systems and from refined product systems, releases of the two commodities were at approximately the same level for the first time (crude oil spills were formerly about one-third more numerous than refined product releases);
- Unlike small spills, which continued their decline, the number of releases of 50 barrels and more remained unchanged, continuing their pattern;
- Volumes spilled in 2004 remained approximately the same as 2003, due at least in part to 15 thousand barrels released as a result of Hurricane Ivan and its aftermath.

Since 1999, PPTS incidents fell by 46%, volume fell by 50%.

In 1999, there were 657 incidents reported to PPTS, and in 2004, there were 358 reported.¹ Since 2001, there has been a decline each year. Barrels released, while falling from 138 thousand barrels in 1999 to 70 thousand barrels in 2004 for a 50% decline, have shown a more uneven year-to-year pattern. Between 2003 and 2004, for instance, the volumes released rose very slightly, due at least in part to releases related to Hurricane Ivan and its aftermath. The data for 2005 will also show a significant volume released related to hurricane damage, affecting onshore and offshore oil pipelines and shore-based facilities in the region.

The number of small spills has declined more rapidly than large spills.

Spills of less than 5 barrels account for about 2/3 of the total number of incidents reported between 1999 and 2004. These spills fell by 50% over the period, from 441 in 1999 to 223 in 2004. Spills of 5 barrels or more fell by 37%, from 216 to 135. The reduction in the more numerous small spills has been a key to the overall improved record with respect to the frequency of releases.

Spills of 50 barrels or more have numbered about 70 each year since 2001.

Spills of 50 barrels or more account for 14% of the total number of releases but account for 98% of the volume released. As such, it is not surprising that they have a greater rate of environmental and safety impacts, and more of them affect private property through damage, inconvenience, or demands on the local infrastructure. Thus, lack of progress in preventing the large spills also hinders the industry in reducing these negative impacts on the surrounding community.

Most large spills occur on onshore pipe; facilities spills are more numerous.

Overall, the releases from facilities piping account for more than half of the number of incidents, but only about one-quarter of the spills that are 50 barrels or more. Onshore pipe, in contrast, accounts for about 32% of all spills, and 63% of those that are 50 barrels or more.

Most frequent incident causes: equipment failure in facilities piping, corrosion in onshore pipe. Biggest impact on the public: third party damage.

Overall, failures of equipment and non-pipe components account for the greatest share of incidents, a total of 37%. A critical factor for risk assessments, however, is that almost 80% of equipment/non pipe failures occur in facilities piping, away from the right-of-way and the public; these failures account for 56% of the incidents in facilities piping. In contrast, corrosion is the leading cause of onshore pipe releases, with a 48% share. 70% of those corrosion releases occur along the right-of-way, where potential impact on the public is greatest. . Current or prior third party damage releases continue to important. While they account for less than 7% of total incidents, nearly 90% of these releases occur along onshore pipe right-of-way, putting those not associated with the pipeline at risk. Not only does third party damage account for a greater share of onshore pipe spills (15%) than of all spills, it is also the greatest cause of incidents involving death and injury.

¹ All findings in this advisory exclude releases from unregulated gathering lines.

**Third party damage is the largest cause of large spills on the right-of-way.
Equipment failures tend to result in small spills.**

Also critical in risk assessments is that large spills and small spills have different cause patterns. Third party damage, for instance, accounts for 7% of all releases, a small share. However, it is the largest cause of large spills, accounting for 25% of releases of 50 barrels or more, and 39% of spills of 50 barrels and more along the right-of-way, the single largest cause of spilled volume. Equipment failures, in contrast, account for 38% of all releases, but 16% of releases of 50 barrels or more and 45% of releases smaller than 5 barrels. Since these equipment-related releases largely occur and remain contained in facilities, not along the right-of-way, they are typically not a threat to surrounding people or property. Thus, addressing equipment releases will have a big impact on the number of releases, but not on volumes spilled or risk to the public. The opposite is true of third party damage – a small impact on the number of releases, but a big impact on spill volume and potential consequences to the public.

Third party damage is the cause most often associated with fatalities and injuries.

Third party damage, either current or past, was involved in 4 of the 5 fatality incidents from 1999-2004, causing 10 of the 11 fatalities during this time period. Third party damage was involved in 6 of 16 (nearly 40%) of the incidents that resulted in injury, involving 15 out of 31 injuries. All of the fatalities and all of the injuries due to third party damage were “others” – meaning they were members of the public or workers who were not employees or the pipeline’s contractors. Operator error was the next highest cause of incidents involving an injury; the 10 people who were injured in 5 incidents were all pipeline employees or contractors. Corrosion incidents did not result in any fatalities or injuries over the 1999-2004 time period.

Crude oil systems experienced the most releases, but have improved markedly.

Overall, more than half of all releases occurred on crude oil systems, but their number fell from 352 in 1999 to 153 in 2004, a 57% decline. Releases from refined product systems went from 261 to 164, a 37% decline. Thus, crude began the period with about 35% more incidents per year than refined product, and ended the period at about the same number of incidents per year. Corrosion has been the largest cause of crude oil releases, so pipeline inspections associated with integrity management efforts inevitably improve crude oil performance, and reduce the number of spills occurring on onshore pipe. Refined product releases, in contrast, more commonly occur in facilities piping, and will be reduced as improvements in facilities continue. HVL incidents are relatively infrequent, but tend to have high volumes. (By the nature of HVLs, vaporization may result in the release of all of the product between the block valves, either during the incident or as a controlled release during the response phase.)

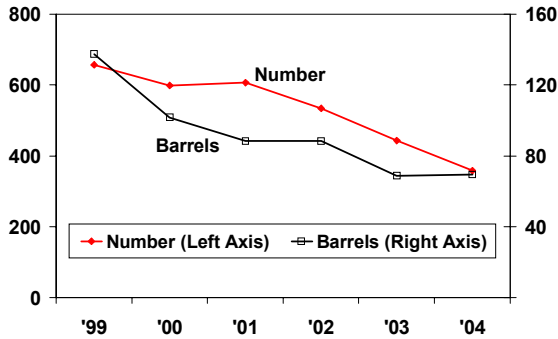
More information is available

The Data Mining Team has prepared a series of operator advisories that are available at www.api.org/ppts. These advisories, which cover the leading causes of incidents, challenges presented by facilities integrity, and reporting difficulties, also include “Considerations for Operators” to help target efforts. Updates of the key advisories will be published over the coming months.

PPTS Releases, 1999-2004

Fig. 1

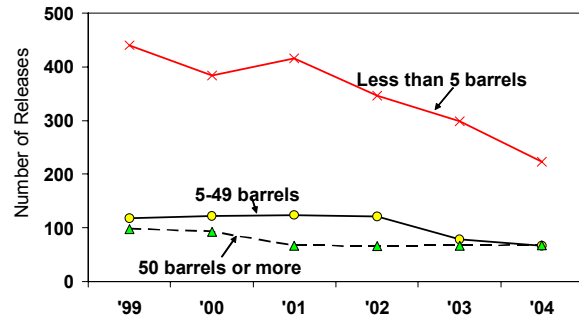
Number of Releases and Volume Spilled, PPTS, 1999-2004



Source: Pipeline Performance Tracking System

Fig. 2

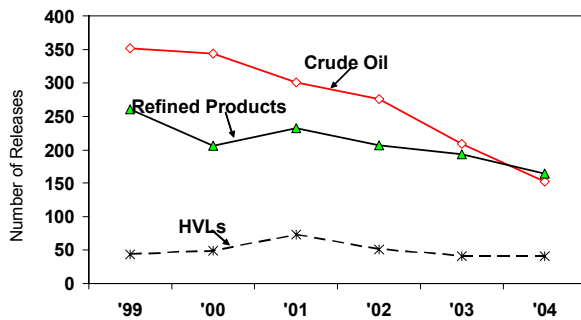
Releases by Spill Size, 1999-2004



Source: Pipeline Performance Tracking System

Fig. 3

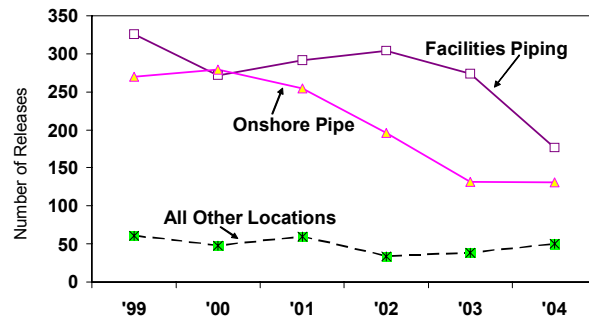
Releases by Commodity, 1999-2004



HVLs: Highly Volatile Liquids such as propane
Source: Pipeline Performance Tracking System

Fig. 4

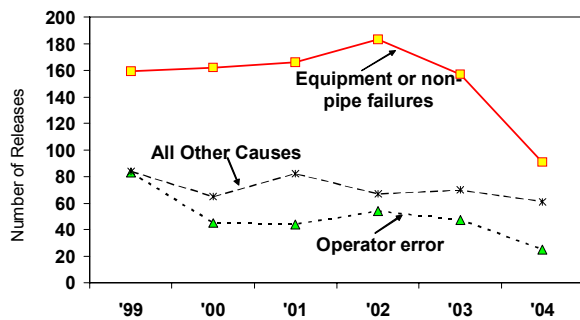
Releases by Location on the System, 1999-2004



All other locations: tanks, caverns, offshore pipe
Source: Pipeline Performance Tracking System

Fig. 5

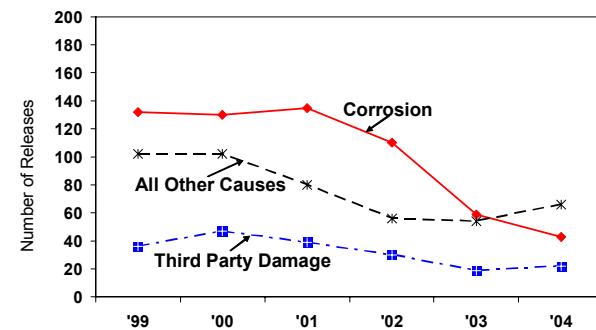
Facilities Piping: Causes of Failures, 1999-2004



All Other Causes: corrosion, material/pipe seam failures, natural force damage, "other," third party damage. Source: Pipeline Performance Tracking System

Fig. 6

Onshore Pipe: Causes of Failures 1999-2004



All Other Causes: equipment failures, material/pipe seam failures, natural force damage, operator error, "other." Source: Pipeline Performance Tracking System