

The liquid 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 results.

This is one of a series of industry advisories drawn from the data compilations of the Pipeline Performance Tracking System, PPTS.

PPTS ADVISORY FOR OPERATORS: INTEGRATING ILI USE AND LESSONS

PPTS Data Show that ILI Use, Alone, is Not Sufficient

Many operators have not experienced a release on previously inspected pipe, but this desired result is not universal. Over the 1999-2001 period, 77 incidents occurred on pipe that had been internally inspected by an inline inspection (ILI) tool. Of these, 32 were inspected by a specific type of tool that was designed to find the anomaly or defect involved in the failure. (Examples would be corrosion incidents where the segment was inspected by a metal loss tool such as magnetic flux leakage, or pipe material failures where the segment was inspected by a geometry tool, caliper tool, hard spot tool or crack tool). Previously inspected pipe was involved in 13% of the External Corrosion incidents, 7% of Internal Corrosion incidents, 44% of incidents caused by Prior Third Party Damage (see caveat below), and 25% of the incidents involving a Pipe Defect or Pipe Material Failure. Thus, while the numbers of incidents in

some of these categories are still small, these results suggest that running an internal inspection tool is only one step in implementing an integrity management program. Further steps require discipline around using the tool's information: interpretation, integration of the information with other available data sources, investigation, and execution of mitigation and repair measures.

ILI in Context

For many petroleum pipeline operators, inline inspection is a primary tool in their risk assessment and mitigation programs. In 2001, PPTS respondents ran an ILI corrosion tool through about 11% of the system mileage, a dent tool through 9% of the mileage – probably much of it inspected at the same time as the corrosion tools, but targeting different anomalies – and other ILI tools through a little over 1% of the system mileage. Inline inspection (or an approved substitute) is now also required in pipeline segments that could affect high consequence areas. Baseline assessments, often including inline inspection, must take place over a 7-year period for designated segments, and the regulations specify a re-inspection interval as well. In the coming years, therefore, ILI will be relied upon even more to locate pipeline weaknesses. New developments will continue to enhance both tool effectiveness and the specificity of targeted anomalies. Use of ILI tools, however, will also continue to be just a component of operator strategies to mitigate risk and thus prevent spills.

ILI Considerations for Operators

Oil pipeline operators should not consider ILI practices to be the silver bullet in stopping pipeline releases. This is confirmed by the PPTS data. Operators who have experienced a spill on a pipeline system where an ILI tool was run prior to the release should re-evaluate the data from tool runs to help them plan for future ILI tool use. The following items are among those that operators should consider:

- Given the system's characteristics and history, was the ILI tool used designed to find the likely anomalies or defects?
- Did the ILI tool's instrumentation record the anomaly or defect? (An important caveat with respect to prior third party damage: the tool could have been run before the pipeline sustained damage.)
- Did the vendor correctly identify the anomaly? Did the operator examine the log? Was it compared to the log from any earlier runs?
- Were the operator's mitigation/repair criteria aggressive enough? Were they followed?
- Was the dig, if any, located according to the ILI log? If the identified anomaly was not found, was there further review of the ILI log and the dig record?
- For crude oil, if evidence of external corrosion was not found at the location of an anomaly identified by ILI, or if the clock position of the anomaly on a crude oil line was on the bottom of the pipe, were additional measures taken to identify the likelihood of internal corrosion?
- Did the corrosion grow to failure more quickly than expected?

The increased use of ILI tools will carry new challenges for the industry and the ILI tool vendors. Tool availability and the prompt availability of vendor reports is a particular concern as operators seek to maintain the prescribed schedule for inspection and repair. Sacrificing accuracy for timeliness, however, would ultimately undermine the effectiveness of the inspection program.

The increased use of ILI tools is also widely expected to bring about more excavation/digs to evaluate identified anomalies. Operators will be challenged to sustain safe excavation and repair practices while undertaking these increased, more aggressively scheduled digs. As the PPTS data show, excavation damage was involved in all of the incidents involving deaths in the 1999-2001 period, and causes a disproportionate share of the releases involving injuries and fires/explosions. In addition, it causes the greatest loss of pipeline barrels. Based on PPTS data, operators and their contractors caused nearly 20% of the excavation damage incidents of 5 barrels and more from 1999-2001. Thus, it is critical to undertake these increased, more aggressively scheduled digs with care: host of other recommended practices that have been identified in industry studies locating them carefully, taking extra effort to find the target anomaly on the first attempt, digging by hand around the pipe, and a. Otherwise, it is entirely possible to cause a large incident while trying to prevent a small one.

A table summarizing the incidents that have occurred on internally inspected pipe over the 1999-2001 time period is available at <http://ppts.api.org/>. This table will be updated annually.



Future fact sheets will discuss new lessons learned as they are developed.

For further information about PPTS and its lessons, go to <http://ppts.api.org/>.