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Re: Comments on PHMSA's Draft Leak Detection Study

The American Petroleum Institute (API) and Association of Oil Pipe Lines (AOPL) are pleased to offer the following comments on the report on leak detection, prepared for the Pipeline and Hazardous Materials Safety Administration (PHMSA) by Kiefner and Associates, Incorporated. The comments are necessarily limited to a few major issues due to the short time period allowed for review.

API and AOPL member companies employ a host of technologies and strategies to prevent, detect and minimize leaks and ruptures. The primary goal of pipeline operators is to prevent leaks and ruptures from occurring in the first place. In 2011, operators reported spending $1.1 billion on integrity management programs assessing, inspecting and maintaining their pipelines. Operators are also implementing recent PHMSA control room management regulations and have launched industry-wide efforts to improve leak/rupture detection and emergency response outreach, training and drilling. Each of these areas were cited by accident investigators as primary causes of recent incidents.

Leak detection systems (LDS) play a significant role in pipeline operator safety programs, as the study documents. Whether to install additional or different LDS is a question operators regularly ask themselves. External LDS present operators with serious performance and reliability concerns coupled with extremely high installation costs on nationwide transmission pipeline networks. This makes operators question whether safety performance is best enhanced by spending finite resources elsewhere. Operators would benefit from additional data on the real-world cost and performance record of LDS as experienced in the field. Unfortunately, this study does not present such information.

In the main, the report includes an extensive recitation and largely academic description of LDS, their technologies and potential applications. However, this study presents relatively little in-depth data or analysis of the actual experiences of operators using these technologies, their operational experiences, or benefits and costs in practice. The study hints at many of these issues, but never explores them substantively or with any numerical analysis. A critical reader is left unable to make any accurate assessment on the technical, operational or economic feasibility of LDS.

In reviewing the technical feasibility of LDS, the study describes reliability and robustness as key concerns, but provides no data or quantifiable operator experiences to allow an accurate assessment of LDS reliability. The section on quantifying performance contains no actual performance data. Academic formulas an engineering student might use to calculate performance are reproduced, but with no recent examples or experiences. In the technology benefits and drawbacks section (p. 4-33), internal LDS technologies were successively described as having "generally poor sensitivity, producing " false alarms," being "very insensitive, many missed leaks," and "not very sensitive," without any numerical description of performance rates, false alarm rates, maintenance costs or costs to fix or mitigate them. The study noted that only 3 external LDS are in active use, but admitted all are pilots or experimental and provided no data on their performance (4-42). It did not ask why or determine the degree to which performance and cost issues are a factor. We urge PHMSA to ensure that these technical issues are addressed before it makes any assessment of technical feasibility.

In reviewing operational feasibility, the study notes operators should consider the reliability, availability and maintainability of LDS. However, it provides no detailed analysis of cases where LDS were deployed, or operator experiences with maintainability or reliability. For example, questions such as what maintenance was needed, how often, performed by whom, and with what level of training are not answered. Similarly, there was no data provided on reliability experiences in the field, false positives or failures. We urge PHMSA to ensure that these operational questions are answered before it makes any assessment of operational feasibility.

In reviewing economic feasibility, study authors make unsupported, flawed or superficial assumptions, which undercut their analysis. Authors admit that they are underestimating LDS costs by providing costs for only a basic leak detection system, something they acknowledge a prudent operator would not prefer (p. 6-7). The study also overestimates benefits of LDS. The study assumes that LDS would reduce containment costs by 75% "without any idea about the engineering specifics of the pipelines" they studied (p. 6-9). Nor did the study subtract out the releases where LDS would not have made a difference when totaling the costs of recent incidents that could have been avoided with LDS. Indeed, the study allows the 2010 Marshall, MI release (p. 6-8) to skew its avoided-cost data because LDS would have done nothing to lessen the costs of this record-setting spill blamed largely on control room management operations issues.

In addition to faulty theoretical scenarios, the study's examination of operator experiences is lacking. Study authors asked operators "purely technical issues" on budgeting cycles, cost-benefit approach and risk management processes (p. 6-20). They seem not to have asked, and did not collect, any actual data on experienced costs employing LDS, their installation costs, maintenance costs, or training costs. Nor did the study compare quoted purchase prices to actual eventual costs, maintenance costs over time, and replacement costs. The reader is left with a complete inability to determine the actual experienced costs of LDS. We urge PHMSA to ensure that these economic questions are answered before it makes any assessment of economic feasibility.

Additional examples of poor data collection, methodology or analysis include basing industry views on the interviews of 9 liquid pipeline operators, 5 gas transmission operators and 5 gas distribution companies. There are approximately 350 liquid pipeline operators registered with PHMSA. Along with a very limited sample size the report does not present a structured interview methodology to support the data reportedly gathered from operators. This industry survey data is cited in the report to justify a number of conclusions and more extrapolated data points. There are a number of avenues available to gather statistically significant data on industry practice. The report makes a poor attempt at this goal. We would be glad to work with the authors to help identify and close data gaps.

The report collates data that can be used for analysis of leak detection effectiveness. There are a number of weaknesses in the actual data analysis provided. For example, the report does not segregate low consequence events. Reports for less than 5 barrels, no impact to water, no death, injury, fire or explosion, and property damage of no more than $50,000 do not require an answer to the questions on the presence of CPM systems or SCADA. The report interprets this as a poor response rate by pipeline operators and uses this interpretation to extrapolate data points. In another example of flawed data analysis, the report compares 1986-2004 PHMSA incident records with the mid-2010 to 2012 records. In this comparison the average reported leak size was lower in the later data set. The report does not recognize the reason for the difference in the average spill size in the two data sets is the fact that the minimum reporting size for a leak went from 50 barrels in the period before 2002 to 5 gallons in the period starting in January 2002. The report goes on to use this data comparison to validate a number of the report's assumptions about operator leak history. These and a number of other flawed uses of the PHMSA incident data are used to support various conclusions or extrapolate new data points. The problems with the data analysis lead to problems with some of the report's conclusions.

The report attempts to categorize and then explain various leak detection technologies. In a number of instances the report confuses leak detection technologies with leak detection products. The section on external leak detection is a catalog of commercial products being marketed to the pipeline industry. The performance metrics stated in the report for external systems are not attributed to any independent source. The report does list the numerous drawbacks of these types of systems in cross country pipeline applications. Then the report makes assumptions in the return on investment calculation section that do not take into account the cost of the very drawbacks reported early in the report for these systems. The different treatments for this issue in different parts of the report add to confusion over the practicality of leak detection methods.

The report offers a number of analysis methods that our reviewers believe can prove valuable in answering the questions posed in the PHMSA study request. The fundamental data input into the analysis must be improved or the conclusions will not result in an improvement in the state of leak detection of regulated pipelines. Thank you for the opportunity to comment on this study. We look forward to seeing how PHMSA and its contractor will address our concerns in the final study. Please see the attached Appendix for specific comments within the report sections.

Sincerely,

Peter T. Lidiak	Andrew J. Black
American Petroleum Institute	Association of Oil Pipe Lines

Attachment