**Public Quarterly Report**

**Date of Report:** 11th Quarterly Report, July 1, 2025

**Contract Number:** 693JK32210009POTA

**Prepared for:** Government Agency: DOT and Co-funders

**Project Title:** Innovative Leak Detection Methods for Gas and Liquid Pipelines

**Prepared by:** Pipeline Research Council International, Inc.

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**For quarterly period ending:** March 30, 2024

**1: Items Completed During this Quarterly Period:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Item #*** | ***Task #*** | ***Activity/Deliverable*** | ***Title*** | ***Federal Cost*** | ***Cost Share*** |
| *29* | *1* | *Quarterly project management & status update* | *Submit 11th quarterly report* | *$2,113* | *$4,313* |

**2: Items Not Completed During this Quarterly Period:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Item #*** | ***Task #*** | ***Activity/Deliverable*** | ***Title*** | ***Federal Cost*** | ***Cost Share*** |
| *21* | *5* | *Quasi transient pack method documentation* | *Quasi transient pack method documentation* | *$19,880* | *$17,680* |
| *24* | *2* | *Pipeline simulated leak analytics w/ tuned and 'as found' system* | *Summary report of simulated leak results.* | *$11,579* | *$11,579* |
| *26* | *3* | *Host site data monitoring and analytics* | *Results to be included in quarterly report* | $57,575 | $55,375 |
| *28* | *1* | *Draft final report* | *Submit 11th quarterly report* | *$2,113* | *$4,313* |

**3: Project Financial Tracking During this Quarterly Period:**



*Note that this chart reflects Federal share only.*

**4: Project Technical Status**

***Host Site Data***

Additional analytics were performed on the host site data including validation of the accuracy of the zone inline meter accuracy. A conclusion of the analysis was that accumulated zone imbalance offers a better method to determine in which zone and when significant changes in zone measurement occur.

***PODS SCADA interface data model***

The development of the SCADA interface data model has been completed and published in the official PODS database model. Additional rollout communications were made at the PODS spring forum. A podcast on this item is being planned for the [Pipeliners Podcast](https://pipelinepodcastnetwork.com/pipeliners-podcast/). This was not planned as part of the original scope for this project and the associated costs will be absorbed by PRCI and PODS.

***Flow Pattern Matching***

Code to validate the flow pattern matching methods against large data sets has been completed. The revised method facilitates more meters than there are rows of data. More analysis of the host site data will be performed to further refine this method prior to documentation in the final report.

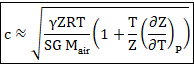
***Quasi transient pack sensitivity analysis***

The data shows that significant errors in lost and unaccounted are generated by pipeline pack (inventory) is not properly accounted for in gaseous systems. The improvement to the currently used method is to include a lag filter on the calculated pipeline pack based on real-time pipeline pressures.

Additional analysis was performed utilizing PRCI transient data, simulated data, and host site data. Much more analysis has been performed than originally estimated with this project with any extra costs being absorbed by PRCI. The analysis has concluded that a first order lag filter works very well to model transient pack changes without the complexity of online transient models. The time constant for the lag filter has a first order approximation directly proportional to the length of the pipeline:



This requires that a reliable yet simple method for estimating the speed of sound for real gases is necessary. This is where additional, unexpected work is currently being performed. This is calculated by:



Current efforts involve verification that these calculations can be performed using the methods developed under previously completed work under this project *PR000-22605-R06 Accurate Compressibility Estimates for Natural Gas*.

A second order approximation of the time constant for the lag filter includes friction and pipe diameter effects:



Work continues to empirically determine the appropriate tuning coefficients to be applied to this equation for (1) engineering unit conversions, (2) simplification to eliminate Dref. and (3) empirical tuning to best fit the real pipeline data.

**5: Project Schedule**

The project is slightly behind schedule based upon the work completed despite having some tasks lag behind and no-cost (to PHMSA) scope additions. Overall, the project is estimated at 90% complete on a plan of 92% by end of project Q10.