Atmos Wave

Sensitive and accurate pipeline leak and theft detection using rarefaction wave or negative pressure

The challenge
In recent years, an increasing number of reported pipeline leaks and thefts have increased sensitivity to leak events. These can cause human fatalities, environmental catastrophe and property damage. They also result in fines, clean-up costs and damage to reputation. While leak detection systems cannot reduce the probability of a leak, the optimal implementation of an advanced technology will reduce the consequences of leaks significantly.

To provide maximum support to pipeline operating companies, the ideal leak/theft detection system should:
- Detect leaks quickly
- Locate leaks accurately
- Issue minimal false alarms
- Be easy to retro-fit
- Work under all operating conditions
- Use low cost sensors with high reliability and low maintenance

Main features
- Detection time as quick as two minutes
- Distance between sensors can be as much as 240km
- Can detect a leak as small as 0.1% of flow rate
- Leak location accuracy as low as 0.25% of the monitored section between sensor pairs
- Algorithms allow the detection of closing “leaks”, which is very useful to identify theft events
- Uses “off-the-shelf” pressure sensors from reputable manufacturers
- Non-reliance on flow meters, flow meter performance, calibrations and availability
- The data acquisition hardware - AWAS-3 incorporates local data storage to mitigate the effects of communication failures
- Complies with API 1130, 1149 and 1155
What is Atmos Wave?
The Atmos Wave leak detection system detects the negative pressure waves associated with the onset of a leak or theft. These rarefaction waves propagate out from the location of the release in both directions to the pressure sensors at the ends or along the pipeline. Atmos Wave uses wave rarefaction to identify and pinpoint where the leak has occurred and how much fluid is being lost.

Three comprehensive algorithms filter out noise and arrange the analogue pressure data into a detailed 3-dimensional map. This allows the system to differentiate true leak/theft events from the pressure changes caused by transient operations.

Atmos Wave complements Atmos International’s statistical leak detection system Atmos Pipe and has been rigorously tested on operational pipelines with great success. Extensive performance evaluation and field trials have proven that Atmos Wave consistently differentiates opening and closing leak/theft signals from transients.

System outputs
- Leak alarm
- Leak location
- Leak rate and volume lost
- Leak time
- Watchdogs via OPC

Sensors used
- Primary sensors are pressure meters positioned 0.3km – 240km apart
- Flow, pressure or strain gauge can be used as the secondary sensors

Data source
Data is required at 60Hz with an AWAS unit.

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