# Theft Net

Already curtailing product theft on pipelines all over the world

Theft Net expert analysis has helped pipeline operators reduce the high cost of illegal product theft; thousands of liters of lost product and repairs to damage caused by illegal taps. Most important of all, Theft Net has reduced the risk of catastrophic accidents on pipelines.

An explosion or environmental disaster costs far more than the stolen product

While the actual cost of small product losses may be little, the cost of repairs and the risk can be enormous. In many cases, illegal taps are poorly crafted and leak product. This can damage the environment or, much worse, cause a catastrophic explosion in a populated region.
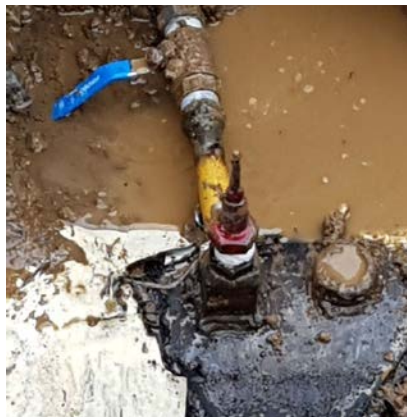
Evolving faster than thieves' techniques

Product thieves change their attack methods to evade detection and location of their illegal tapping points; e.g., reduce theft sizes and open theft valves at slower withdrawal rates. Atmos International applies years of experience and extensive understanding of the challenges in leak and theft detection to continuously develop more effective solutions and continually upgrade the Theft Net service and hardware to detect new theft techniques.

What is Theft Net?

Theft Net combines fixed and portable hardware solutions to collect and analyze pipeline data. Experienced engineers trained in the latest theft detection techniques analyze the data in greater detail to locate the theft site to within meters. The human element adds superior accuracy while maintaining highly sensitive theft detection without the distraction of false alarms.

SCADA systems miss most theft events

Theft events are usually very small product losses. Standard sensors on most pipelines can at best detect leaks as small as 0.5% of the nominal flow rate and will miss most theft events as such events are less than 0.3% of the nominal flow.

The Atmos Theft Net service can detect and locate a theft to within 5 meters for product losses as small as 0.1% of the nominal flow rate in static or running conditions. The Theft Net service has even detected the theft of samples as small as 10 liters of product during static conditions.

Our skilled engineers apply unique analysis techniques to data from existing pressure sensors and SCADA data to find critical changes invisible to the SCADA system and report the times and locations of illicit tapping points.

Examples of thefts detected by Atmos

Figure 1

Atmos trend shows the beginning of the theft in this pipeline under static conditions. The pressure falls for several hours as the thieves extract the product.
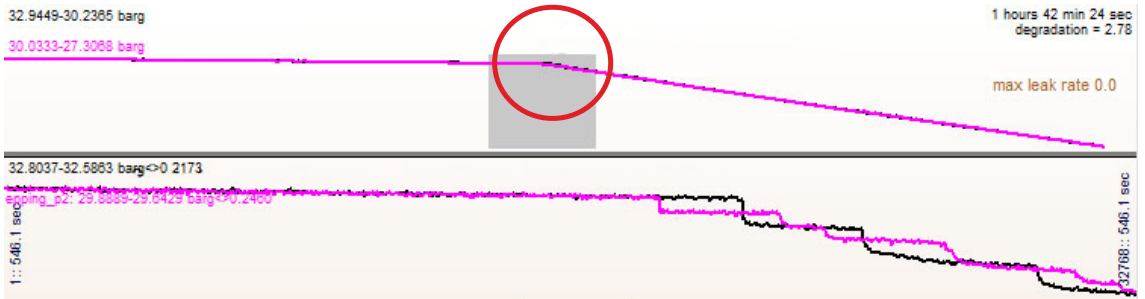

Figure 2

Atmos trend shows a theft occuring in flowing conditions.
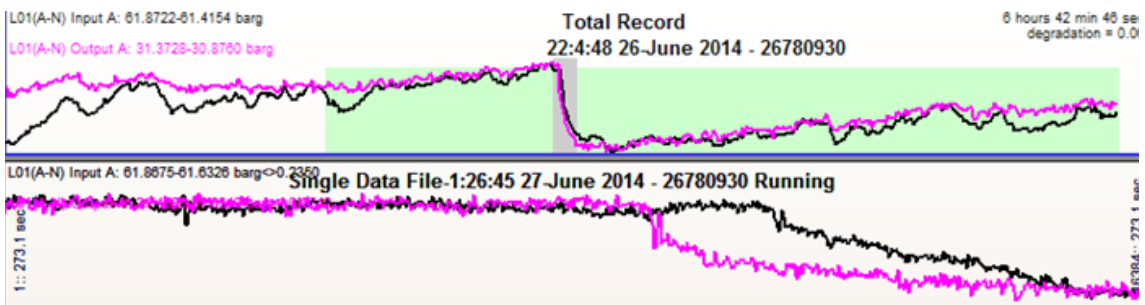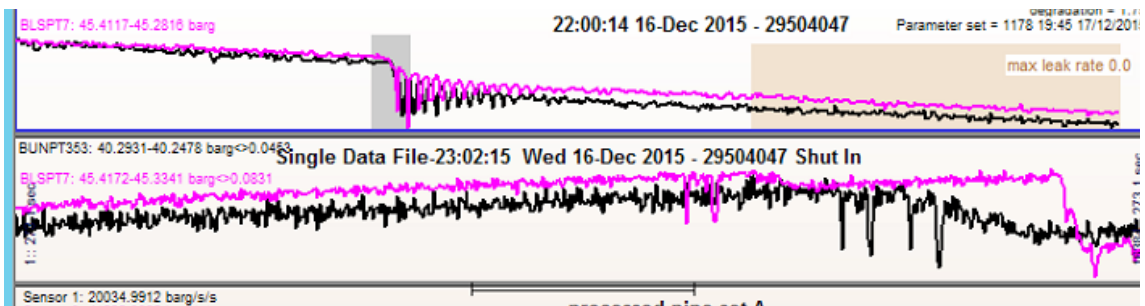

Figure 3

Atmos offline analysis of these trends detected and located theft of sample amounts as little as 10 liters per hour.

Theft detection hardware solutions

Atmos theft detection solutions use both intrusive and non-intrusive hardware options for greater leak location accuracy.

Portable Data Logger

This portable, autonomous, data-logging, solution can be rapidly deployed to collect pressure data and flow data from existing instruments on a pipeline where a leak or theft is suspected. The Theft Net engineer quickly analyses the offline data and reports back to the customer.

Pipeline entropy and instrument uncertainty cause false alarms when the threshold of an online system is set to find minimal leaks. The Theft Net analysis removes these false alarms, allowing detection and location of very small losses.

The portable data-logger can quickly and efficiently find illicit connections and estimate the potential performance of a permanent leak detection system on a pipeline. Atmos is successfully using this equipment to detect illegal tapping points on numerous pipelines around the world.

Atmos Battery Powered Pressure Data Logger - Odin

Odin is a battery-powered, offline data acquisition unit designed to find pipeline product theft in locations with no power or communications. This rugged ATEX designed unit (approval pending) is small and inconspicuous and easily installed either underground, at valve points, or at other locations where thieves will find it hard to detect.

Odin data provides the same sensitivity as data acquired by a permanent leak and theft detection system. This data is collected and sent to Atmos periodically for analysis, Atmos then reports the results back to the client.

Odin is a useful tool to detect and discourage pipeline thefts where thieves can attack standard leak detection equipment.

Theft Net has become an industry force detecting numerous tapping points in many countries around the world, from the UK, China, Turkey, Lithuania, Italy, Denmark to Costa Rica, Peru and Colombia. This technology is proven to detect and deter pipeline theft. Several case studies are presented below.

Case study 1

Theft Net engineers analyzing data from an Atmos leak detection system monitoring a UK pipeline network detected an oil theft. The thieves connected a high-pressure hose to their illegal, 12mm, tapping point and routed the hose 1.5 kilometers through the woodland to an abandoned farmhouse. They buried the hose and concealed it within the hedgerows along the route. It was almost impossible to distinguish between the hose and branches of the hedgerows. The abandoned farmhouse served as a center for theft operations with storage tanks that could store thousands liters of fuel. From there, thieves could steal at any time without the risk of being seen. The thieves also scattered dead animals along sections of the 1.5km route to mask the scent from sniffer dogs trained to detected spilled fuel. After locating the tapping point and tracking the hose route, the pipeline operator notified the police in time to capture the criminals. This theft example emphasizes the importance of leak location accuracy and highlights the skills and determination of thieves to hide their operations.

Case study 2

Theft Net engineers detected and located seven tapping points on a single UK pipeline over a nine-month period. One of these thefts was a stolen sample of only 70 Liters: thieves in the UK more commonly take around $1m^3$. The Atmos team detected and accurately located this theft to within two meters of the actual tapping point. The pipeline operators and the police deployed a surveillance team the next night, and the team arrested the thieves and confiscated their equipment. The thieves had come prepared to steal 1,000s of liters of fuel. They used a truck with a container inside that could hold $5m^3$ of fuel. Some of them even had night-vision technology to operate without drawing attention. They planned to conceal the hose beneath the truck and, once they finished stealing, they would return the hose and other theft equipment to the truck.

The hose is barely visible (top left corner)

The thieves used dead animal parts to deceive sniffer dogs

Milk container used to store 1000s of liters of fuel

Case study 3

Atmos Theft Net engineers have recently been very effective in detecting and locating illicit tapping points in Central America. In a three-month period, Atmos identified and located thirty tapping points on a pipeline network. Our engineers detected these events during flowing and shut-in conditions even though the pipeline runs across challenging terrain and has considerable elevation changes. This success was the result of the high leak location accuracy and sensitivity provided by Atmos Wave and the Theft Net service. This specific pipeline network runs through areas of rainforest and populated areas, making it very easy for the thieves to conceal their activities. For example, the thieves had dug tunnels and trenches within the forest to hide the hose route and the storage tanks and, in one case, even used a river crossing to mask the path of the hose to the illegal tapping point. The hole sizes of these illicit penetrations are often between 2mm and 10mm, the pressure changes caused by theft are barely detectable.

Collection of illegal tapping points detected in Central America

Examples of buried tapping points

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About Atmos International

Atmos International (Atmos) provides pipeline leak detection and simulation technology to the oil, gas, water and associated industries. The company was founded in 1995 in the UK by the inventor of the statistical pipeline leak detection system – Atmos Pipe, now one of a suite of leak and theft detection solutions from Atmos. These technologies are realized on hundreds of pipelines in over 50 countries, including major oil and gas companies such as Shell, BP, ExxonMobil, and Total. With associated offices in the USA, China, Russia, Singapore and Costa Rica, and local agents in 28 countries, the multi-cultural and multilingual team can provide adequate support all over the world.

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