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Open and Shut: Smart, Reliable Thief Hatch Monitoring in Tank Batteries

A hatch left open or not fully sealed allows emissions to continuously vent out into the atmosphere. While producers once worried about lost product, the focus has shifted to environmental concerns.

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In major oil basins, almost half of all emissions are from storage tanks. One way that emissions escape is from open thief hatches: the manual access points to each tank. While normally closed, some thief hatches are accidentally left open after access. Tank batteries are located on remote storage sites that can cover many miles and go days without seeing

a site visit. As such, these open thief hatches may go undetected — and release emissions — for extended periods of time.

In response, governments are taking regulatory action. New regulations include more stringent emissions limits per well pad, over 65% lower than previous regulations. Some states, including Colorado and California, have passed regulations that require

constant checking as well as documentation that each thief hatch in a facility is closed and latched. Major sites in violation have been fined up to \$25,000 per day that an operator cannot account for a hatch being closed and properly sealed.

To further reduce emissions, the U.S. Environmental Protection Agency issued a proposed rule last November under the Clean Air Act that recom-

The latest thief hatch monitoring technologies easily install on both new and existing thief hatch models and can reliably sense if a thief hatch is properly latched.

mends performance standards for greenhouse gas emissions for new, modified and reconstructed sources within the crude oil and natural gas source category, including an option to use new technology for fugitive emission detection. To reliably monitor thief hatches and limit emissions, many producers are using smart technology like this.

LIMITING EMISSIONS FROM OPEN HATCHES

Thief hatches have several important functions. They serve as a tank's maintenance access hatch and the primary level of pressure protection for venting and vacuuming. Thief hatches have also allowed producers to check tank levels and media properties required to complete custody transfer. Although, because of fugitive emissions and worker safety, this is a practice the industry is trying to move away from.

During site visits, thief hatches are frequently accessed by a variety of personnel measuring the contents of storage tanks, transferring fluids to

and from the tank or testing the thief hatch seals. Unintentionally, hatches may be left fully open or, more frequently, closed without being securely latched. Without reliable monitoring, days or weeks may pass before personnel notice an open or unsealed hatch and close it. As chemicals evaporate, the vapors escape through the open hatch and enter the atmosphere.

As a sealing element, thief hatches are inherently subject to leakage. While manufacturers and producers have long collaborated to develop better, tighter sealing thief hatches, no seal can account for a failed closure. A newly built, closed and properly sealed thief hatch can limit emissions to the minimum levels required to meet regulations, but a hatch that's left open or not fully sealed allows emissions to continuously vent out into the atmosphere. While producers once worried about lost product, the focus has shifted to environmental concerns.

Confidently knowing that a hatch is sealed is paramount, but providing documentation that it actually is can be complex. To meet regulations, operators need more than status updates; they need precise data to complete

required emissions calculations and reports. Producers must know how long each hatch at a facility is open and confirm it's closed and securely sealed after access to measure total site emissions and ensure those emissions remain under the allowable limits.

FINDING A SOLUTION THAT SIMPLIFIES EMISSIONS CALCULATIONS

In addition to physical inspections, regulations require producers to self-audit and report emissions calculations back to agencies. On a weekly basis, operators must confirm and document that each thief hatch is fully closed and sealed. They are liable for each day that they are not able to account for and may be fined.

In the past, producers might have changed procedures to put contingencies in place and gather data manually. Today's demand for process efficiency, however, calls for automation. While thief hatch monitoring solutions have been available, early designs had a consistent issue — false signaling. Early monitoring systems sometimes made no distinction between a latched and unlatched thief hatch switch, which resulted in a false trip.

When hatches must be accounted for daily, a false trip can have huge consequences. Since the thief hatch may display as open when it is, in reality, closed and latched, increased emissions may be erroneously recorded and operators may invest unnecessary time manually checking thief hatches.

Another challenge is the sheer range of thief hatch designs in the field. There are thousands upon thousands of thief hatches in tank batteries, from brand new to those that are decades old. It's essential that a monitoring solution easily installs on and fits multiple models and designs.



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Mounting patterns, latch positions and angles differ from product to product.

INTEGRATING RELIABLE THIEF HATCH MONITORING

As the process industry continues to undergo a digital transformation, equipment monitoring is not new. Yet it has been slower to catch on in remote storage at upstream tank batteries. The latest thief hatch solutions are beginning to change that.

There are now advanced solutions that address the biggest challenges in thief hatch monitoring. The latest monitoring technologies reliably sense a thief hatch is properly latched and easily install in the field on both new and existing thief hatch models. Producers can receive these solutions in modular mounting kits that allow them to retrofit their thief hatches in the field using only simple tools.

that guarantees no false signaling will occur. The sensor is designed to reliably operate in high- and low-temperature extremes, high-pressure and potentially explosive environments.

Like a proximity switch, the sensor has no moving parts and uses magnets to detect a ferrous metal or magnetic target. Like a limit switch, it provides highly precise readings. By combining these features, the sensor requires far less maintenance than traditional limit switches and performs within harsh environments that often prohibit the use of other technologies, such as inductive or capacitive sensors.

The sensor can connect to the wireless transmitter, which offers control system access to discrete points that are otherwise not connected due to wiring costs and lack of input/output. The transmitter automatically

thief hatches and remotely monitor their status without false trips. This helps ensure that emissions readings are accurate and reduces personnel trips to the field.

ENSURING EMISSIONS REMAIN WITHIN LIMITS

Reliable thief hatch monitoring is a key step toward digital transformation in the process industry. Whether facilities are taking the first step or are far along their digital transformation journeys, it's important that they have an expert partner to support them. Such providers deliver a comprehensive offering of intelligent solutions, from valves and sensing technology to software and services, that can optimize the safety, reliability and performance of a facility's most demanding applications.

It's critical to monitor and confirm that thief hatches are closed so they don't contribute to overall emissions limits. Implementation of such a reliable thief hatch monitoring system has been widely overlooked for decades, and operators are beginning to see the benefits of connecting everything in their facilities. Cutting down on the time that operators use to check and document the position of these hatches increases the producer's efficiency, digitally transforms their operations and helps ensure they remain in compliance. **VM**



Tank farms are often located in remote locations with infrequent personnel visits, which means that if a thief hatch is accidentally left open, it may not be detected for an extended period of time.

The kits include an ultra-reliable, sophisticated proximity sensor and easy-to-install wireless transmitter that precisely and continuously monitors hatch position in real time, allowing operators to confidently ensure that hatches are fully sealed when not being accessed.

The precision position sensor is specifically designed to signal only when a lid is fully latched. Proven in mission-critical, process applications, it features a robust bracket design

keeps a time-stamped record of each time the thief hatches are open and closed. Operators can access a 24-hour automatic log of thief hatch status, which reduces the need for visual tank inspections. Since the connected sensor doesn't draw power, optimizing the battery life of the wireless transmitter, both devices are certified for global explosion-proof applications.

The simplicity and sophistication of the design allow producers to easily install the system on both old and new

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