

Oil Leak Monitoring with Polymer Absorption Sensor and WirelessHART Technology – Case Study

Results

- Early leak detection and notification
- Public and environmental protection
- Cost effective in-service installation
- Immunity to false alarms

Application

Underground leak detection monitoring

Customer

Oil producer in the United States

Application Characteristics

Aging production infrastructure is located near wetlands. Unnoticed underground oil leaks would result in costly remediation.

Challenge

The customer wanted to detect underground leaks from remote field assets in real-time. In addition, a standalone monitoring system was needed so integration into their existing DCS/SCADA would not be required. Installing wired monitoring devices was cost prohibitive and hindered by limited power so the customer wanted wireless battery-operated ones.

The region has harsh environmental conditions. Winter temperatures can drop below -20°C (-4°F) and summer temperatures can rise above 30°C (86°F). Clear skies are typical for the region so equipment has exposure to prolonged periods of direct sunlight and UV radiation. Snow and frozen soil in the winter and thunderstorms in the spring and summer are a common occurrence.

Syscor's Polymer Absorption Sensor and WirelessHART technology was developed in close cooperation with the petroleum industry



Syscor's PCU-X01 Sensor Hub mounted to a Stackable Monitoring Well containing two HCD sensor probes

Solution

Syscor's Intrinsically Safe and completely wireless HC-Tracker™ monitoring system was deployed to the site. Assembly and installation required no hot or cold work. All of Syscor's deployed monitoring devices have a battery life of 10+ years based in a sampling rate of once per minute.

Assembly: Hydro-vac equipment was used to dig three wells close to the production infrastructure. Stackable Monitoring Wells, each 16 feet (4.9m) in length were constructed by threading 2-foot (61cm) sections of stainless steel, perforated tubing together. Bundles containing two Syscor Hydrocarbon Detector (HCD) sensor probes, instrumentation cables, and a polyfluoro wicking sleeve were placed within each Stackable Monitoring Well. Gravel was used as backfill, which creates a preferential pathway for oil to contact the Polymer Absorption Sensors within each HCD (butane and heavier).

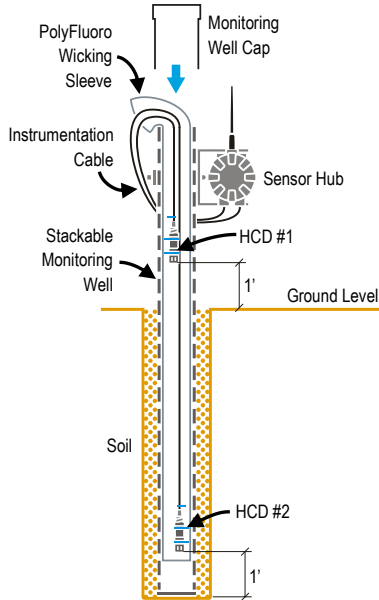
Sensor Hub Installation: A PCU-X01 Sensor Hub was mounted to each monitoring well with a Universal Mounting Bracket and U-bolt. Each Sensor Hub antenna was mounted to the monitoring well using a standard hardware bracket. Instrumentation cables with robust, UV resistant properties connect each HCD to a Sensor Hub.

IloT System Enclosure: Syscor's standalone Industrial-Internet-of-Things (IloT) System Enclosure was mounted on an existing structure and powered with 120 VAC supply. The enclosure's WirelessHART Gateway communicates data from each Sensor Hub and HCD to a cellular modem. The operator views the data through Syscor's monitoring software. An optional heater was installed to protect the enclosure's devices from cold temperatures. The enclosure's WirelessHART and cellular antennas were installed with optional lighting arresters, which were sealed and grounded to the structure.

Components

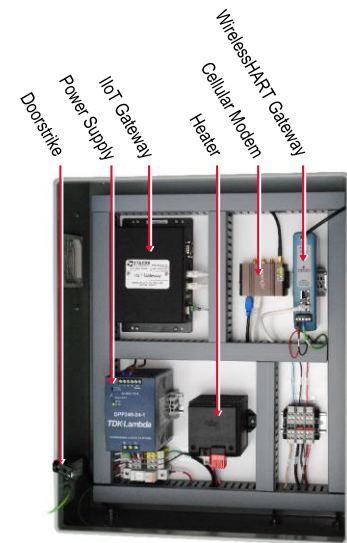
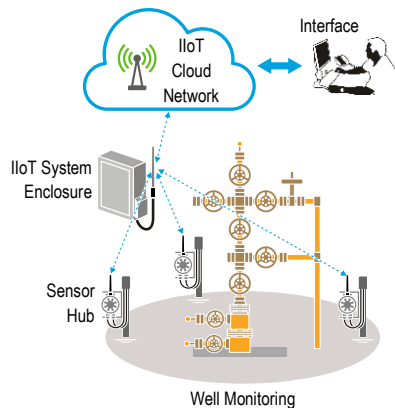


PCU-X01 Sensor Hub with HCDs



Specifications

Enclosures	Stainless steel 316 (Sensor Hub & HCD)
Rating	Sensor Hub: IP67, HCD: IP68, Sensor Hub & HCD: NEMA 4X
Operating Temp.	-40°C to +60°C [-40°F to +140°F]



IloT System Enclosure

About WirelessHART

WirelessHART is a communication standard (IEC 62591; 2.5 GHz DSSS) adopted by the petroleum industry. It is a secure, scalable, and self-forming mesh network protocol. Device data interconnects with site DCS/SCADA through a WirelessHART Gateway. Configuration of mesh communication paths is not required. WirelessHART security is robust consisting of industry standard techniques. WirelessHART devices add redundancy to existing operations and monitor conditions where wired alternatives were not previously feasible.

Syscor reserves the right to change product designs, specifications, and information without notice.

