

Managing Refinery Wastewater with Wireless Analytical Measurements

BENEFITS

- Perfect for Remote Locations
- Reliable Wireless Diagnostics
- Reduced labor requirements



BACKGROUND

API (American Petroleum Institute) Separators are frequently used in the treatment of refinery wastewater that has been contaminated by oil and oil-bearing sludge. Separators use the difference in specific gravity to allow heavier liquids to settle below lighter liquids. The lighter liquid is skimmed off, while the heavier liquid remains behind.

In a typical API separator (Figure 1), wastewater is first collected in a pretreatment section that allows sludge removal. A diffusion barrier slowly allows the wastewater to flow down the separator towards the outlet while the lighter oil fractions can be skimmed off.

Downstream, other processes are used to more completely remove entrained oil in all forms and to condition the water to meet the specifications for release into a stream or body of water.

PROCESS

pH is measured at the discharge from the API Separator to enhance the efficiency of secondary waste treatment processes, such as flocculation. However, because emulsified oil may still be present at this stage, the pH sensor can become coated, resulting in slow response and eventual failure. Obtaining the benefits of an accurate pH measurement may require regular attention, either by removing and cleaning the sensor or by automating a cleaning regimen using a cleaning nozzle or retraction device. The characteristics of the oil waste itself will determine how often the sensor will need cleaning.

INSTRUMENTATION

The sensor of choice for this application is the 396P pH sensor, which incorporates the high surface area TUpH™

junction. The TUpH design uses 0.5 micron size pores to preserve the pH signal by preventing the formation of a continuous coating on the sensor. The TUpH sensor has been found to greatly outlast other sensors in applications that may contain solids and other coating agents. It is superbly matched with the Model 6081-P Wireless Transmitter, which has been designed for the rugged environment found in refineries and chemical plants. The Model 6081-P simultaneously measures both glass and reference impedance as diagnostics, in addition to pH and temperature. These advanced sensor diagnostics can be used to alert the user to pH glass breakage or the buildup of a coating, and can help predict maintenance schedules.

WIRELESS

One of the largest installation expenses for field instruments is running power and signal wiring. Studies have shown that these costs can be reduced up to 90% by using wireless devices. Rosemount Analytical's Wireless Model 6081-P is ideal for monitoring the pH (and ORP) of effluent streams over widely dispersed areas. The update rate is user configurable from 1 to 600 seconds, and at a 1 minute setting, the power module is estimated to last more than two years. The Model 6081-P uses Emerson's Self-Organizing Network technology whereby each instrument acts as a relay station for all other instruments in range. This enhances reliability as the wireless network automatically changes transmission paths when temporary conditions take individual instruments out of service. The Model 6081-P transmits all process data (including diagnostics) using Wireless HART™ ver. 7 at a frequency of 2.4 GHz and can directly transmit over distances as large as 600 ft to a compatible wireless gateway.

™ TUpH is a trademark of Emerson Process Management

INSTRUMENTATION

6081-P Wireless Transmitter

- Self-Organizing Network for High Data Reliability and Network Stability
- SMART sensor enabled
- Compatible with 1420 Wireless Gateway and WirelessHART™ networks
- Industry Leading Wireless Security
- Continuous Diagnostics Monitor Sensor Performance and Health



Model 396P TUpH Sensor

- Polypropylene reference junction and secondary reference pathway mean longer sensor life and reduced maintenance in process solutions containing heavy solids
- Advanced on-line sensor diagnostics
- Versatile. Can be used in numerous loop configurations with all Rosemount Analytical and other manufacturers instruments

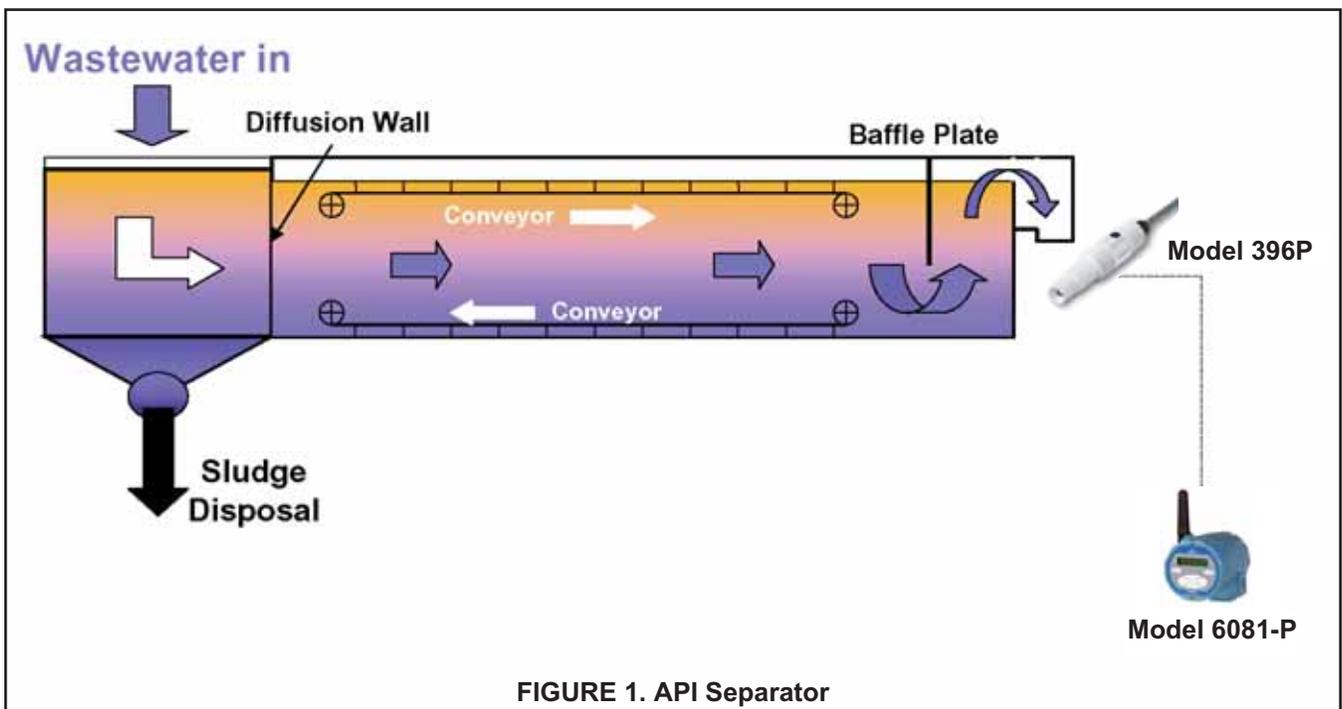


FIGURE 1. API Separator

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