A major oil and gas producer in California has found an efficient and reliable method to measure level in its hydrocyclones.

The company processes crude pumped in from land holdings leased out to various oil drilling companies. The oil, water and gas content pumped from the various leases may vary greatly. To measure the productivity of each lease, the company uses a co-mingling meter system that measures these components before the crude enters the pipelines. At the head works of the co-mingling meter is a 10-foot hydrocyclone. Its inner chamber spins, using centrifugal force to separate the oil, water and gas.

Reliable monitoring of feedstock level in the hydrocyclone is critical to properly control the process and protect against overflows.

**The challenge**

The hydrocyclone receives feedstock (oil, water and gas) through a tangential entry at the center of the vessel. Gas exits through a V-cone on the top of the tanks, while the oil and water emulsion leaves through a valve on the bottom. The emulsion is measured for its oil content to determine productivity of that lease. Then the co-mingling meter sends the emulsion to the pipeline with products from other leases so it can all be processed at a central location.
The company wanted a standalone, low maintenance system for level measurement in the hydrocyclone. The biggest challenge in this application is the changing material make-up and dielectric properties of the feedstock.

The solution

The company installed a Siemens SITRANS LC300 capacitance level instrument on each hydrocyclone to continuously monitor the feedstock level. This installation uses a flange-mounted, rigid probe version inserted through the top of the tank and partially surrounded by a half stillwell to reduce turbulence. As well, Siemens Pointek CLS 200 point level switches are installed at 20% and 90% of material level to act as reference points. The upper level switch operates a high level alarm to protect against overflows.

Unlike traditional capacitance systems that measure voltage drop or current flow, Siemens capacitance instruments measure inverse frequency change. Even small level changes create large changes in frequency, so Siemens capacitance instruments provide better resolution and accuracy, especially in short spans or materials like oil with low dielectrics.

The Pointek CLS 200 point level switches are unaffected by changing dielectrics, and provide reliable and consistent points of reference. The outputs of the Pointek CLS units provide contact closures. Whenever level reaches the reference point, the SITRANS LC300 instrument is automatically recalibrated for the mixture coming into the hydrocyclone.

The benefits

The operators all have multiple responsibilities and their time is critical, so they appreciate that the Siemens instruments operate as a standalone system that requires no tweaking of instrumentation. This frees staff time to manage other tasks.

With reliable level measurement in place at each hydrocyclone, the company has improved process control and efficiency. Reliable hydrocyclone operation facilitates use of the co-mingling meter which allows the company to operate a central processing plant instead of satellite plants at each lease. This represents a significant saving on equipment and staff costs.