Originally appeared in:
September 2009, pgs 15.
HYDROCARBON PROCESSING®

HPI INTEGRATION STRATEGIES

WIL CHIN, CONTRIBUTING EDITOR

wchin@arcweb.com

Emissions rules demand flexible fuel terminal blending

There's no avoiding the inevitable; it's time for terminal owner-operators to get ahead of the fuel blending automation curve. The migration of blending to marketing load terminals, and eventually to retail stations, is becoming a reality due to increasing regulations and consumers' increasing appetite for greener fuels.

Marketing terminal blending requirements pale in comparison to refinery blending systems that must contend with widely varying constituents, many with nonlinear characteristics. However, today's increasingly more complex blending of conventional, reformulated and biofuels can benefit from the proven measurement and control solutions deployed in process automation.

Diverse fuel end products require flexibility. Refinery blending has always been extremely complex since many fuels, such as gasoline, are actually a mixture of many components. Fortunately, marketing terminals do not have this complexity, but they will need to contend with an increasing variety of products as tighter emissions regulations take hold.

Whether or not the EPA ruling to allow California and many other states the option to enforce stricter greenhouse gas standards forms the basis for a single nationwide standard in 2012, this ruling and other regulations will likely demand an increasing number of fuels and require different clean fuel blending recipes at the regional marketing terminals. As owner-operators build new terminals and upgrade their existing blending systems, they should consider adopting the most accurate solutions with the flexibility to measure and blend a variety of constituents, from very small to large quantities, to accommodate whatever changes may come.

Pick the right blending technology. Traditional blending methodologies deployed in marketing terminals include ratio, sequential, sidestream and splash blending. Ratio blending is in the best position to meet current and future demands. Ratio blending provides multiple flow loops engineered to accurately meter the correct quantity of components within specification without over-addition of the high-cost component, such as ethanol in an E10 blend of gasoline and ethanol. This assumes that an appropriate batch controller/flow computer incorporates blending algorithms that correct for nonlinear mixing and component interactions.

Optimize fuel blending at load rack. Increasingly, load-rack blending is becoming more desirable due to reduced footprint, elimination of tanks and increased product flexibility of load arms that can provide various blends on demand in exact quantities without waste.

Regardless of the methodology selected, accurate online measurements are key to terminal operator profitability. Using the most accurate field devices (for flow, level, temperature and pressure measurements) and control valve technology will help terminal operators improve efficiency and reduce product give-away that may not be measurable by lesser field devices. Today's automation equipment is well suited to the hazardous area environment of load racks. However, the multitude and complexity of formulations of fuels with widely ranging percentages of from 10 to 100% ethanol for export requires the utmost in rangeability and response from both flowmeters and control valves.

For example, the flowmeters of choice in blending systems are mechanical PD and turbine meters. These typically wear with use, resulting in under-reading of blend components and increased product giveaway. New digital flowmeters, such as compact Coriolis meters, can provide much greater accuracy and have been field-proven to provide accurate long-term measurements without adjustments to the meter due to their nonwearing measuring elements. More importantly, picking the right blend methodology with precise measurement will reduce the possibility of loading off-specification products, which could require costly reblending operation to obtain saleable products.

Terminal operators tend to be conservative creatures-of-habit who would rather deploy proven technologies and processes than take additional risks; even if those risks could, in the long run, help reduce total cost of ownership and improve both productivity and profitability. Even though newer technologies have been proven in other parts of the oil and gas industry, terminal operators require further evidence of success in their applications. In this case, "proven" means reliability, safety and quantifiable benefits.

In countries where grassroots terminals are being constructed, Coriolis meters are more frequently deployed than are mechanical meters. Lessons learned in these applications should be more easily transferrable to legacy installations in the US, but upgrading a legacy blending system presents obstacles. This is particularly true for the Coriolis meter. Since the mechanical meters and typical Coriolis meters have different pipeline installation lengths (flange face-to-face), modifications to the piping will be necessary that will drive up the installed and project costs, including the time required to complete the change.

Load terminals are becoming much more important to the fuel distribution supply chain and terminal automation systems incorporating advanced flow measurement and blend control technology can contribute greatly to marketing terminal profitability.

The ability to blend a wide range of constituents and the precise measurement of key variables, particularly flow measurement, will allow operators to efficiently blend the clean fuels of tomorrow. HP

The author leads the field device consulting team at ARC covering process measurement technologies. He is responsible for pressure, flow, level, temperature and related markets. Mr. Chin also covers field device communication protocols, plant asset management (PAM) and laboratory information management systems (LIMS). He has nearly 30 years' experience in the areas of sales management, product marketing and engineering in industrial field instruments.

AR-001241