



Winter's Been Good for Western Propane

Sam Clark, owner of Intermountain Truck, Intermountain Mechanical, and Mountain States LP Gas Transport (Ogden, Utah), had customers knocking on his door to lock in supply contracts before he even set the tanks at his new storage terminal in Ogden. Supply in the region was slim because of the closure of Enterprise Products Partners LP's Moab underground storage in Southeast Utah in 2005. Local refineries started using propane to fuel their own operations, and Clark saw a business opportunity.

"We currently have a half-dozen wholesale customers and a handful of retailers who load bobtails," says Clark, who founded Intermountain Truck Rebuilders, a bobtail manufac-

turing company, in 1992 and Intermountain Mechanical, a firm specializing in bulk installations, in 1994.

Ground breaking for the project began June 1, 2006, and the plant opened on Feb. 1 of last year. The new 180,000-gal.-capacity facility operates as Western Propane Storage LLC and is located on a nine-acre site in a recently developed industrial park. Construction of the new plant was performed by Clark's Intermountain Mechanical, which constructs bulk plants across the nation. Corken supplied the pumps and compressors. The tanks were sourced through Total Energy from a Briggs & Stratton manufacturing plant in Milwaukee.

Western Propane Storage (WPS) has rail services with Union Pacific and

Burlington Northern, as well as local service by Utah Central Rail that provides two switches daily. Product is sourced from both Canadian and U.S. refineries. Clark notes the permit process for the facility went fairly smoothly, and that no major issues stood in the way of construction. His own transports, operating under Mountain States LP Gas Transport, also load at the facility. Mountain States operates 27 transports throughout Utah, Idaho, Wyoming, Nevada, Washington, and Oregon.

The facility can unload six railcars and load up to 12 transports daily. Two "Rocky Mountain doubles" can be loaded at a time. Loading time for a transport is about an hour. Western Propane Storage is strategically locat-



The design of Western Propane Storage LLC's site allows for the future installation of eight more 90,000-gal. tanks to supplement the two 90s now in place. Intermountain Mechanical, also owned by Sam Clark, constructed the storage terminal.

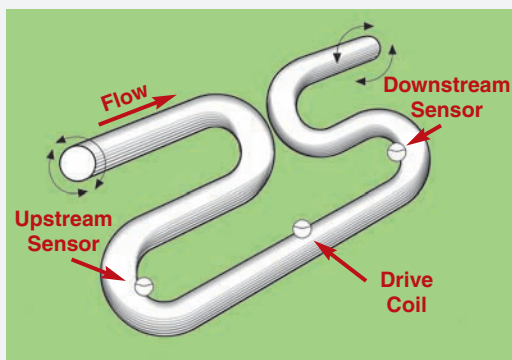
Coriolis Metering—A Primer

Coriolis mass flow measurement devices, which date to the 1970s, are rapidly replacing positive displacement meters in many applications. Mass flow meters measure mass directly, independent of the physical properties of the fluid such as viscosity, temperature, pressure, or density.

Volume changes with temperature, and volume measurements must be corrected based on ambient conditions. For example, 164 kg of alcohol occupies 208 liters at 5°C, but at 25°C, the same mass occupies 212.6 liters. Mass, however, is a primary measurement, and remains constant.

Coriolis meters exhibit metrological performance unmatched by volumetric flow meters, with increased accuracy, improved product consistency, and reduced maintenance. Precision measurement of continuous processes over long periods reduces inventory shrinkage. This performance, along with the Coriolis meter's ability to measure both liquid and vapor phases of LPG, fueled the industry's rapid adoption of this technology.

To provide precision control from receiving through distribution, Actaris offers Coriolis technology as an integrated part of a control package for an entire refinery or bulk distribution operation. The bulk inventory tracking system brings all product flows under measurement and control. Coriolis mass flow meters measure every liquid-phase flow and vapor-return loop, and relay the data to a central monitoring computer. Custom software provides a detailed log of every event, and can be coupled with accounting software or monitored remotely to



track the status of every process in the plant. The result: reduced shrinkage, more efficient ordering and billing, and optimized cash flow.

How It Works

The Coriolis force flow meter measures mass flow directly using the Coriolis Principle. To visualize this, imagine an omega-shaped vibrating tube as shown at left. If no liquid is flowing through the tube, the drive coil in the middle of the tube will cause the two sides to vibrate in

phase at their natural frequency.

When liquid begins to flow, mass flowing into the meter starts to receive vibrational energy from the tube walls as it enters the first bend, and the tube loses that same amount of energy—the phase of the vibrational cycle lags at the upstream sensor location.

The reverse happens at the downstream sensor location. The liquid is vibrating as it enters the bend, but transfers this energy to the tube—the mass flow advances the vibrational phase at the downstream sensor location. Combined, these two changes in vibrational phase produce a “twisting” of the flow tube. The amplitude of this twist is directly proportional to the mass flow rate and is virtually independent of the temperature, density, or viscosity of the liquid involved. Other information can also be calculated from this process. For example, the frequency of vibration of the flow tubes varies with fluid density, and this frequency can be measured to determine the fluid density and/or percent solids/concentration.

ed along the old Denver-Rio Grand tracks, with additional freeway access to I-15 and I-84. There is storage onsite for up to 16 railcars, and additional railcar storage is available at the nearby Ogden Rail Yard, a half-mile away. The design of the plant allows for the future installation of eight more 90,000-gal. tanks to supplement the two 90s now in place.

Clark notes that the past winter was a busy one for WPS. The plant, which operates 24 hours a day, had 462 transports loading between December and February.

Working with Actaris (Greenwood, S.C.), an Itron Co., WPS installed four of the company's Coriolis mass flow meters, which accurately measure both the liquid transfer and vapor-return when unloading rail cars and loading transports and bobtails. The meters are connected to a custom-designed bill of lading and inventory system located in the office. Unlike meters that measure positive displacement, the Actaris Coriolis mass flow meters measure mass, not volume. Mass is a primary, constant measurement, which is not

affected by volume changes caused by hotter or cooler temperatures.

“There are four [meters] in all, two on the rail side, that meter the liquid in and the vapor back. The computer tracks the transfer and subtracts the vapor back, and then creates a bill of lading,” Clark says. He added that the pounds of vapor that return after pushing off liquid are automatically converted to gallons. “With mass flow meters, there are hardly any restrictions. You can load quickly, and they keep the pressure down, cutting wear



The WPS facility utilizes Actaris dual-tube mass flow meters for both liquid and vapor measurement. Shown above is a 3-in. m300 unit (left) for liquid; at right is an m200 unit for vapor.

and tear. And you know precisely how much vapor has been recovered, which reduces product losses.”

Gary Herrington of Actaris explains that mass flow meters have no moving parts, eliminating much of the restriction that slows the loading process and stresses equipment. Precision measurement, both for liquid and vapor in and out of the plant, diminishes inventory shrinkage. Actaris 3-in. m300 meters serve the liquid side at the Western Propane Storage plant, while m200 meters are installed on the vapor side.

“Often when vapor is pulled out of a plant to push off liquid there is a negative for the plant's inventory at the end of the operation,” observes Herrington. “The vapor returned isn't accurately measured when it is pulled back, resulting in product losses. Coriolis technology is exact. It lets you know precisely what's going on because the measurements aren't affected by the density of the product. The whole system is tied to a computer software program, which generates a bill of lading in gallons for accurate plant inventory.”

—John Needham