



CASE STUDY

INDUSTRY: REFINERIES



CUSTOMER: Kinder Morgan, Inc.



LOCATION: Houston, Texas, USA

BACKGROUND: Kinder Morgan, Inc. is one of the largest energy transportation and storage companies in North America, operating more than 35,000 miles of natural gas and petroleum products pipelines and more than 145 terminals. Its pipelines transport two million barrels of gasoline and other petroleum products per day, and up to 8.4 billion cubic feet of natural gas. Kinder Morgan is also the leading provider of CO₂ for enhanced oil recovery projects in the United States.

SCOPE OF WORK: Kinder Morgan's Yates Field, located in Iraan, Texas, produces oil and natural gas products. Kinder Morgan recently purchased this property from Marathon Oil Company and is in the process of injecting Carbon Dioxide (CO₂) for enhanced oil recovery. As part of the program, Kinder Morgan is upgrading production test stations to monitor the performance of each well.

Each station accepts several wells into a header system after which vessels are used to separate the oil, water and natural gas into separate streams. The natural gas leaving the stations flows into gas collection lines then to the gas processing plant as shown here in the photo below.



Two factors were important to Kinder Morgan when selecting the Verabar as the primary flow sensor over other technologies:

- The first and most important is the reduced loss of energy inherent to the Verabar. By having a small pressure drop, the pressure at the station is kept at a minimum allowing the wells producing into the station to operate at a lower pressure. This allows each well to produce more product by not having to overcome a higher pressure at the station.
- The second is the ease of installation, requiring only a single entry point in the top of the pipe to measure the differential pressure, temperature, pressure and output a dynamically compensated mass flow rate. All of these installations use existing piping, making a single entry point less labor intensive than cutting pipe and welding flanges into place.

Gas flows, pressures and temperatures vary depending on the number of wells feeding the station at any given time. To compensate for pressure and temperature variations, the Verabar selected for this application a Foxboro brand multivariable transmitter (IMV30). The IMV30 measures static pressure, differential pressure produced by the Verabar and a temperature input from an RTD that is integral to the Verabar. The IMV30 then computes the compensated flow rate and transmits the flow output to a local PLC then into Kinder Morgan's scada system.

BENEFITS: Through a single pipe penetration, as illustrated in both the photo and the drawing below, and with minimal energy loss, the Verabar flow systems have been very successful measuring a wide range of gas flows. The Verabar has become an important component for Kinder Morgan in monitoring the performance of their wells.

