U.S. Department of Energy Measures Difficult Environmental Flow

DynMcDermott Operations Co., Inc., a Department of Energy prime contractor for the Strategic Petroleum Reserve, is responsible for the flow metering required to meet Environmental Protection Agency (EPA) permit requirements for brine disposal pipelines to the Gulf of Mexico. EPA requires semi-annual integrity tests to be performed on each brine disposal line. The flow rate is measured simultaneously at a point on shore and at a point miles out into the Gulf near the dispersion nozzles. The flows then are compared to determine if the pipeline has a leak. The criterium for a successful test is a 4 percent or less difference between the two measurements.

In the past, a pitot tube meter was used to profile the pipe and measure the flow at the two points. The valuable time required by divers to accomplish flow profiling on the gulf sea floor and less than satisfactory results led to a search for a better flowmeter. Marsh-McBirney's Multi-Mag was chosen for the job.

The Big Hill brine line in Jefferson County, Texas was tested over a required two-hour period on June 29, 1996. Big Hill is a 14-mile-long, 48″-diameter pipe and is one of the DOE's toughest flow metering applications. The recorded flows from the two Marsh-McBirney flowmeters matched to within 0.21 percent.

For more information on this subject, circle 865 on the reader service card.

Figure 1: Big Hill Magnetic Flowmeter Site Installation

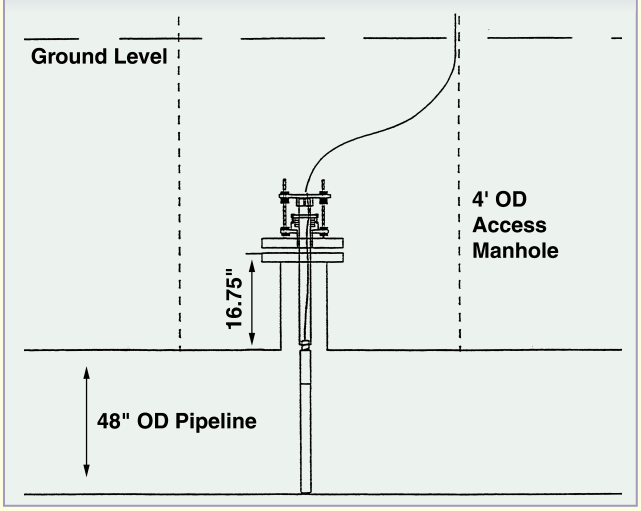
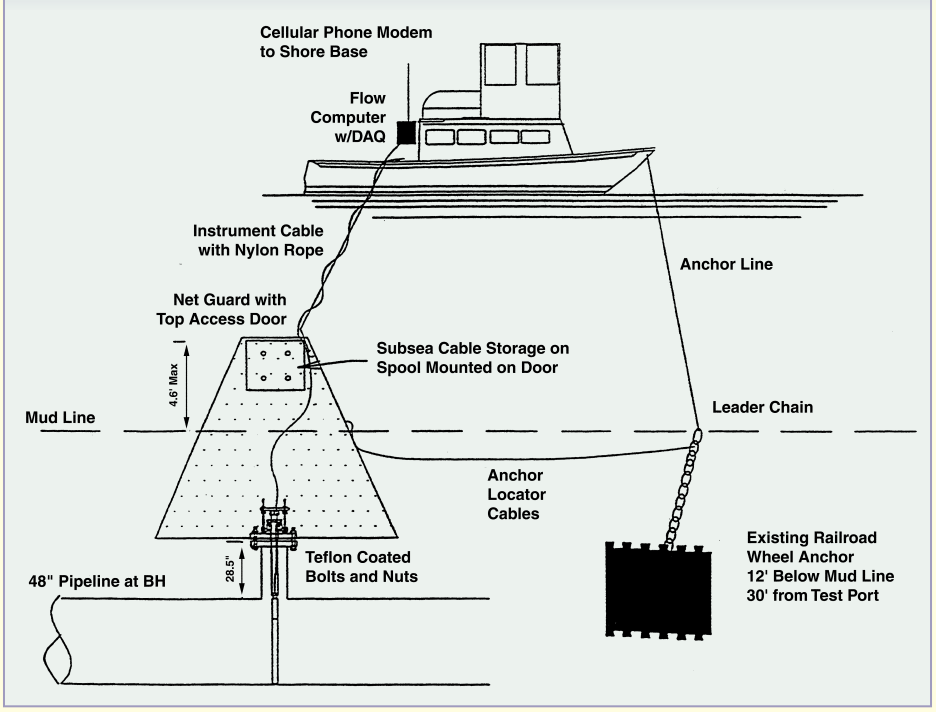


Figure 2: Design for Offshore Flowmeter at Big Hill



How the Multi-Mag Insertable Meter Works

The Multi-Mag meter features an array of electromagnetic sensors that are strategically located on the insertable probe that spans the entire pipe diameter. This insertable probe detects and compensates for shifting profiles, unlike spool-piece meters and flowmeters that provide only a single point of flow measurement. The streamlined sensor shape minimizes flow disturbances, thus providing minimal pressure drop.

The Multi-Mag flowmeter is a high-strength probe designed for high velocities and large pipe sizes. The insertable multi-electrode sensor is suitable for pipe sizes 36″ to 120″.

With hundreds of installations worldwide, the meter has proven itself in difficult flow conditions such as shifting profiles, low flows, wide flow ranges and bend/elbow installations. Accuracies better than 1 percent of reading are typical. Suitable applications include potable water, raw water, water containing sand and grit or other debris-free applications.