



APPLICATION NOTE #14

Heavy Oil, High Viscosity Well Testing Application Note

Staatsolie is the Suriname's State Oil Company operating the only oil field in Suriname. It is an onshore operation with heavy crude between 13° and 16° API gravity. Their extraction method is by PCP (Progressive Cavity Pump). They are not injecting any diluent nor have any thermal method to reduce the viscosity. The produced oil is very heavy, high viscosity approximately 2000 cP at 80° – 100°F, water cut is between 60 – 80% with a Gas Void Fraction from 0% up to 60%.

Up until 2001 they tested each of their wells by using a 100 bbl tank. Between 3 to 8 wells will flow through individual flowlines to each of these tanks. The tank will fill for a distinct period of time to obtain the volumetric flow rate measurement by manual tank strapping, then water cut was determined by averaging the water content of samples collected at different depths of the tank (Top, Middle and Bottom). Due to the nature of the heavy, viscous crude oil the tanks have a large amount of foam which can take up to 24 hours to settle.

In 2001, Staatsolie bought an Agar MPFM-302-20 for High Viscosity service. The MPFM was mounted on a small trailer (see attached picture). After an evaluation period comparing the test tank readings to the MPFM, they have been testing the wells with the MPFM rather than their test tanks.

During well testing the MPFM is powered by the same transformer that powers the PCP pump. The well line is diverted through the MPFM using flexible hoses. Staatsolie reported that they were happy with the MPFM performance and it became their standard method for well testing. The tests are started with no more than two hours of well stabilization time and then about one hour of well testing. Then the MPFM is moved to another well. They can test up to four wells per day when the distance between wells is short. A good portion of their wells were actually low producers that fell below the measurable liquid rates of the MPFM 302-20 (250 – 5000 BPD Total Fluid Flow Rate). Because of this, in 2004 Staatsolie ordered MPFM 302-10



2001 Vintage



2004 Vintage

(50 – 1500 BPD Total Fluid Flow Rate) to cover the low flowing wells. This trailer even has an air conditioned cabin with AC power for the operator's laptop.

Staatsolie's is developing another area in a swamp area with even lower producers. They have received 2 additional Multiphase Flowmeters for this field and have ordered a third for the same field.