“Game Changing” Technology
Proposed by Norris

Project Background, Opportunity & Objective

- There are about **500,000 beam pumps** in North America.
- Load and position sensors are required on these pumps to determine when to turn off the pump (Pump Off Control) to avoid damage to the pump.
- Existing systems use wired load and position sensors.
- Theta is proposing development of a wireless combined load and position sensor to be inserted at the top of the polished rod offered by Norris as a superior “game changing” technology.

Product & Market Potential

The proposed wireless sensor could become the sensor of choice. We estimate there are about 10,000 to 20,000 new units installed every year plus roughly 10,000 replacement units. If the wireless product became the sensor of choice, we estimate it could capture 30% market share, or roughly 10,000 units.

Benefits

The proposed wireless sensor would have the following benefits:
- Easier installation – eliminates wiring required on existing systems and improves installation speed.
- Removes major points of failure:
  - Wiring to sensors is subject to wear.
  - Reduces total number of components.
- Simplifies position measurement:
  - Most existing systems use separate position transducers.
  - Some existing systems translate other measurements to rod position.
- Hydraulic pumping units and some other linear pumping units have no accurate way to measure position; a position sensor on polished rod would solve this problem.
OPW FMS Develops a Fuel Quality Sensor for Ethanol Blended Fuels

**Opportunity and Objectives**

With the increasing use of ethanol in place of MTBE in motor fuels across our industry, an opportunity exists to develop a sensor that will provide early warning of a fuel separation event brought about by water contamination of ethanol blended fuels. The potential market for such a sensor is the majority of the developed world now embracing ethanol as an oxygenate in favor of MTBE (or other ethers).

**Defining the Problem**

This invention relates to the separation of a fuel within a storage tank and, more particularly, to an apparatus and associated methods for determining the risk that a blended fuel within a storage tank will separate. While the environmental benefits of ethanol blended fuels have been documented and the commercial usage has dramatically increased over the years, there remain practical challenges with these alternative fuels. One problem with ethanol blended fuels is phase separation. Phase separation occurs when water is present to a minor, but nonetheless significant degree in the fuel. When the blended fuel in the storage tank has separated, the gas station owner has few options for remedying the problem. In this regard, the conventional solution is to evacuate the storage tank and refill the tank with fresh blended fuel. This solution, however, is extremely costly.

Various devices have been developed to indicate when phase separation of a blended fuel in the storage tank has occurred. While generally being effective for indicating whether phase separation has or has not occurred, such devices do not provide any predictive capabilities, i.e., indicating a risk of phase separation before phase separation actually occurs. Once phase separation of the blended fuel has occurred, it is too late for the gas station owner to take steps that might mitigate or prevent the impending separation, or allow the owner to minimize any potential financial losses caused by the fuel separating into its various phases. The aforementioned devices do not help the owner mitigate or avoid the high costs associated with the removal and replenishment of fuel when phase separation occurs.

**The Solution**

OPW FMS is introducing a method which will determine the risk that the fuel in the storage tank could separate. This is done by obtaining a sample of blended fuel from the storage tank. The sample is then cooled until it separates into phases. This ultimately determines the level of risk the fuel will separate based on the cooling step.