



MAXIMISING CRUDE OIL STORAGE CAPACITY

As the supply of oil continues to outpace global demand, crude oil storage has become more important than ever. US stockpiles, which currently sit at 80-year highs, are testing the limits of the nation's storage capacity. Estimates suggest the US has passed its 95% storage capacity, and experts are forecasting that in order to store additional stockpiles, new tank farms are required.

THE NEED TO MANAGE BS&W

Basic sediment and water (BS&W) is the specification describing the impurities that accompany crude oil between the well and the refinery. When crude comes out of the ground, it's accompanied by water, sand, salt and other unwanted debris. These impurities are removed in the refining process - but until the crude is delivered to the refinery, BS&W poses a challenge for storage tank operators.

BS&W, which varies widely from field to field, can reduce the capacity of a storage tank by up to 30%. Over time, if enough BS&W settles on the bottom of a tank, a process called 'sanding-in' takes place, which forces the tank operator to empty the tank and engage in a lengthy, expensive and environmentally challenging cleanup. Such cleanups, which require specialized equipment and expertise, can take months to complete, and can cost anywhere from \$200,000 (€182,000) to over a million dollars.

At a time when storage capacity is maxed out, and monthly storage rates are at an all-time high, facility operators can ill-afford downtime, or any lost capacity due to BS&W accumulation.

Another reason why tank farm operators use mixing pumps is to keep oil of different gravities blended together in the tank, to keep the product as homogeneous as possible until it is sent to the refinery. Water, which is intentionally added in the pipeline, plays an important role in helping to move the oil to the tank storage farm. But once in the tank, water must not be allowed to get trapped at the bottom, because over time, it can accelerate corrosion in the tank.

ENTER THE MIXER

The key to managing BS&W is to keep it in suspension until the crude oil leaves the tank on its way to the refinery. To keep BS&W from settling at the bottom of the tank, operators use large-scale, side-entry mixers. To do this, tank operators use large scale, side entry mixers.

Side entry mixers, which are mounted on the flange of a storage tank, are ideal for large tanks. They feature fewer

moving parts, they minimise vibration, they offer a longer mechanical seal life, and are easier to maintain.

The larger the tank, the more mixers are required. For the largest tanks (that hold up to 1.3 million barrels) as many as six mixers can be deployed to work together. Once the volume and the crude oil specifications (including density and viscosity) inside the tank are known, and the computation flow dynamics (CFD) have been determined, the mixers' impellers turn at the desired speed to keep the crude moving. Performance and reliability for mixers are critical, as the impellers must turn continuously to keep the BS&W suspended within the tank.

Most of the legacy mixers in use today still rely on marine-style, three-blade propellers. These mixers require more horsepower (and energy) to deliver the required mixing intensity and fluid velocity, and they are also more difficult to maintain.

What makes Milton Roy Mixers unique is a proprietary 4-blade impeller called the Sabre. This proprietary design provides the industry's highest flow at the lowest horsepower, delivering a 15-20% energy savings over traditional mixers. For equipment operating continuously, energy savings can be significant.

SIMPLIFIED MAINTENANCE

The side mounted Milton Roy Mixer is simple to maintain because of the small diameter of the Sabre impeller. It is easily inserted into the tank, and just as easily removed (with locking collar seals that use gravity to help seal the tank). The design of the shut off devices enables tank operators to pull a mixer out of the tank for maintenance activities - even if the tank is full. This capability is unique in the industry, because older, marine-style mixers cannot be maintained without emptying the tank, or lowering the tank's level, bringing both real and opportunity costs to the tank farm operator. Fast and efficient shut off actuation capabilities also help to ensure limited environmental impact, by lessening the potential for oil spills or leaks.

THE FUTURE OF US ENERGY MARKETS

The last time the US had so much oil in storage was in 1930. Today the US is producing in excess of 9 million barrels a day, and the ability to increase production is readily available. While current oil prices place a drag on production, storage limitations play an equally-limiting role.

As a result, contingency storage facilities are being dusted off, new storage facilities are being built, and current facilities are being modernised. In all cases, legacy mixers are being upgraded with new side-entry mixers that help minimise BS&W issues, maximise storage capacity, and enhance the tank farm operator's bottom line in the process.

FOR MORE INFORMATION:

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