Water Quality Measurements for Oil Sands Operations

BRACKISH WATER

Measurements of silica, magnesium and calcium in brackish (well) water provide valuable information on water hardness.

WARM LIME SOFTENER FEED

FITNIR Benchtop enables rapid measurement of calcium, silicon and magnesium for the correct lime dosage to the reactor.

PRODUCED WATER

Monitoring the final water after treatment ensures the water treatment is operating correctly to remove dissolved minerals and minimize hardness of the water before it returns to the boiler.

FIT NIR

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The measurement of true liquor properties in the Kraft liquor cycle has been a challenge for the pulp manufacturing industry and the previous generation of analysis. Over the past decade, the advancement of optical analyzers using such techniques as spectroscopy, particularly Fourier-Transform Near Infrared (FT-NIR), have been successfully applied to provide complete liquor composition measurements. As the technology matures, more applications are being developed, some outside of the pulp manufacturing industry.

For oil sands operations using SAGD (Steam-Assisted Gravity Drainage), steam is pumped into the ground to soften the oil deposit which is then collected on a second, parallel pipe and pumped to the surface. Here, steam/water is separated from the oil and the water is further cleaned through filtrations before it is re-used to generate more steam.

The efficiency of this process is measured as a steam-to-oil ratio (SOR), which is an indication of the steam required to produce a barrel of oil.

- ***FITNIR Benchtop enables operations personnel to acquire quick measurements***
- ***Measurements of Si, Ca and Mg indicate water hardness***
- ***Applicable to process streams including feed to WLS, PW and brackish water***
- ***First of its kind in the oil sands industry***

Low SOR results in reduced operating costs due to the decrease in water make-up, natural gas consumed to create steam, and emissions. As such, the recovery of water is critical to any SAGD oil sands operation and to environmental impact.

FT-NIR as applied to water quality is the first of its kind in the oil sands industry where the spectral signature can be used to estimate exceptionally low levels of ppm for Silicon (Si), Calcium (Ca) and Magnesium (Mg) for indications of water hardness. Information on Si, Ca and Mg on the feed-to-WLS (Warm Lime Softener) allows more exact determination of the amount of lime required to soften the water. Measurements of the produced water (PW) and brackish water hardness provide a means to safeguard the boiler.