What is the Quality of WTI/Domestic Sweet?

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Background

• The quality of WTI/ Domestic Sweet crude oil has been vitally important to refiners for decades.

• Refiners were and continue to be concerned about blending of incompatible crudes into the Domestic sweet stream and the detrimental effect this has on refinery economics and operations.

• Beginning in about 2005, the COQA began in earnest developing more comprehensive specs for WTI/Domestic Sweet than just API Gravity and Sulfur.

• Details of this work can be found in the Archives section of the coqa website.
Background

• After years of diligent testing and data evaluation, in 2010, the COQA recommended more comprehensive specifications for WTI/Domestic Sweet.

• Recall, the COQA is not a legislative body.

• Our recommendations were provided to all parties operating around Cushing, OK.

• We actively met with NYMEX and encouraged them to incorporate the specs in their light sweet crude oil rules.
Current NYMEX specs

- NYMEX (CME Group) Chapter 200.12 Light Sweet Crude Oil Futures states Crude and Quality Specifications as:
  - Sulfur - ≤0.42% by wt.
  - API Gravity - ≥37 and ≤42
- There are also published specs for Viscosity, Reid Vapor Pressure (RVP), BS&W, and Pour Point but these do not constrain the stream.
- These limited specs provide little confidence to the refiner of what they are receiving.
COQA Recommended Specifications

- In order to better define the quality of WTI, in a letter dated 10 August 2010, the COQA recommended the following specs be added:
  - MCRT: 2.4% wt. or less
  - TAN: 0.28 or less
  - Nickel: 8 ppm or less
  - Vanadium: 15 ppm or less
  - Light Ends <220°F by HTSD: Not more than 19% by mass
  - 50% Point by HTSD: 470°F- 570°F
  - Vacuum Resid > 1020°F by HTSD: Not more than 16%
Subsequently

• While NYMEX has met with Cushing operators, attended COQA meetings, and voiced support for the COQA specs, they have yet to formally adopt and publish them.

• Despite this, various shippers and operators have reported (see COQA Archives) that the additional specs are being followed in practice.
The question was raised at the last meeting:

In light of increased production in west Texas, what is the current quality of WTI/Domestic Sweet at Cushing?
To answer the question

• Multiple operators at Cushing agreed to provide data to the COQA under the provision that the sources of the data would remain anonymous.

• I thank them for their willingness to share the data.

• I personally do not know exactly where all of the samples were taken or what lab(s) performed the analyses.

• The summary information reflects hundreds of samples taken in the 2013 and 2014 time period.
Current specs

- **Sulfur - ≤0.42% by wt.**
  - Average has been 0.40%. Occasional values over 0.42%. Some results in the 0.20% range.
  - Blenders obviously monitor sulfur closely, blending right to the 0.42% limit.
Current specs

• API Gravity-≥37 and ≤42
  • Monthly averages in 40 to 42 range. Occasional values above 42.
  • Seasonal variation with winter being slightly higher.
  • December 2014 average was 41.6.
  • If your assay does not reflect ~41 API, it probably warrants review.
Current specs

• RVP <9 psi as measured by D5191
  • All values in the 6.5 – 9 range.
  • Some seasonal variability- higher in winter.
  • No concern
  • Seasonal variation with winter being slightly higher.

Crude Oil Quality Association www.coqa-inc.org
COQA Recommended Specs

• MicroCarbon Residue (MCRT) 2.4 % or less
  • Average of 1.6%.
  • Highest month was 1.8%.
  • No concern.
COQA Recommended Specs

• TAN 0.28 or less
  • All values in the 0.12 range.
  • No concern.
  • The new production must be low TAN.
COQA Recommended Specs

- Nickel 8 ppm or less
  - All values in the 4 – 6 ppm range.
  - No concern.

- Vanadium 15 ppm or less
  - In the past two years, the values have risen from the <10 range to 10-15 ppm.
  - Recent values have been right around 15 ppm with frequent excursions above 15 ppm.
  - Review assays.
COQA Recommended Specs

• HTSD specs for light ends, 50% point, and Vacuum resid
  • All values have been consistent and well within the defined specification range.
  • No concern.
Conclusions

• Multiple parties are testing and evaluating data for the COQA recommended specs.
• While NYMEX has not yet formally adopted the specs, the data shows the COQA specs are consistently being met.
• The rising vanadium levels are interesting and should be monitored by shippers.
Conclusions

• The COQA specs were chosen and the values set to be:
  • Meaningful to refiners
  • Practical to implement
  • Routinely achievable
  • No hindrance to the market liquidity of the stream

• The 2013-2014 data indicates these criteria have been achieved!
Thank You