DOMESTIC SWEET/ WTI SPECIFICATIONS

FOR COQA- OCTOBER 2011 IN TULSA, OK
PRESENTED BY: DENNIS SUTTON, MARATHON PETROLEUM
The Need for Domestic Sweet Specifications

- Historically, Domestic Sweet was a blend of various sweet crude oil streams from Western Texas, Oklahoma, and surrounding areas.
- Today, with minimal specifications and greater logistical optionality, Domestic Sweet might include high TAN African crudes, condensate from Colorado, Canadian blends, and heavy Brazilian crude.
- Refiners were increasingly concerned about blending of incompatible crudes into the Domestic Sweet stream and the detrimental effect on refinery operations.
For over 15 years, the concept of more comprehensive specifications on WTI/Domestic Sweet has been discussed.

In 2005, COQG began earnestly developing specifications for WTI/Domestic Sweet at Cushing, OK.

Distillation characteristics, acidity (TAN), metals (nickel and vanadium), and carbon residue (MCR) were identified as necessary parameters in addition to the historical specifications of API gravity and sulfur.
Large quantity of test data was available from various sources. While the data showed Domestic Sweet to be a light, sweet, very low TAN crude, the distillation and metals data showed a great deal of variability.

Different sample locations and test methods contributed to the variability.

Thus, to set appropriate specification limits, further analytical testing was needed with clearly defined sampling and lab procedures.
In 2009, using clearly defined sampling and analytical procedures, a comprehensive testing program was conducted to provide the basis for developing specifications.

61 Samples were provided from four Cushing sources and testing was conducted at three different labs.

To preserve source and lab anonymity, an outside consultant performed statistical analysis of the lab results.

Based on the sample results, the variability in analytical precision, and the need to maintain market liquidity, COQA developed seven additional proposed specifications.

A written ballot was sent on April 1 to all parties involved, and the results were discussed at the June 2010 COQA meeting.

A letter was sent communicating the specifications and recommending their adoption.
The Crude Oil Quality Association (COQA) is a petroleum industry technical organization comprised of members representing refiners, pipeline companies, terminal operators, chemical and service companies, and commercial laboratories. The association is dedicated to the belief that maintaining the quality and integrity of the refining characteristics of crude oil streams is of importance to all parties from production to the refinery. As such, we have been addressing crude oil specifications for more than a decade. The Refiners Crude Oil Quality Group, predecessor of the COQA, was responsible for the successful adoption of the LLS specifications over 10 years ago.

Consistent with our mission and in studies spanning more than five years, COQA has identified key parameters that more comprehensively describe Domestic Sweet crude oil delivered at Cushing, OK (NYMEX Light Sweet Crude Oil Futures), has defined the analytical test procedures to be used in measuring these parameters, has reviewed historical and current quality data for these, and recently reached consensus on the additional specifications shown in the following table.

These additional specifications will provide greater confidence in the quality of Domestic Sweet for all who physically process this grade, as well as those who transact futures and delivery contracts. With this more comprehensive definition of the quality of Domestic Sweet, there will be a higher level of reliability and fungibility of this very important benchmark crude oil.

As part of the detailed statistical review of the data supporting these recommended additional specifications, the COQA, to the best of its knowledge and consistent with its Antitrust Guidelines, anticipates that adoption of these additional specifications will not restrict trade nor be a barrier to free and open competition in the markets.

The COQA recommends the immediate adoption of these specifications as part of the NYMEX Light Sweet Crude Oil Futures Grade and Quality Specifications (Section 200.12) (A), and in the operating procedures of the pipeline and terminal facilities at Cushing. The existing quality specifications for sulfur, gravity, viscosity, Reid vapor pressure (RVP), basic sediment and water (BS&W, S&W), and pour point as detailed in section 200.12 (A)(2-7) of the NYMEX Rulebook are to be retained.
With our broad industry representation, experience, and expertise, the COQA is able and willing to provide support to you in the adoption of these recommended expanded specifications. The COQA remains committed to positive actions that promote and maintain the integrity of crude oil streams.

I thank you for your consideration of these recommendations, and look forward to your response regarding when and how you plan to adopt and implement them.

Sincerely,

/s/
Harry N. Giles
Executive Director

Enclosure: Distribution List

Recommended Additional Specification for Domestic Sweet Crude Oil at Cushing, OK

1) Micro Method Carbon Residue: 2.40% or less by mass; as determined by ASTM Standard D4530-07, or its latest revision;
2) Total Acid Number (TAN): 0.28 mg KOH g or less as determined by the first inflection point; using ASTM Standard D664-09a, or its latest revision;
3) Nickel: 8 parts per million (ppm) or less by mass; as determined by ASTM Standard D5708-05, Test Method B, or its latest revision;
4) Vanadium: 15 ppm or less by mass; as determined by ASTM Standard D5708-05, Test Method B, or its latest revision;
5) Light Ends <220°F by HTSD: Not more than 19% by mass; as determined by ASTM Standard D7169-05, or its latest revision;
6) 50% Point by HTSD: 470°F - 570°F; as determined by ASTM Standard D7169-05, or its latest revision;
7) Vacuum Residuum >1020°F by HTSD: Not more than 16% by mass; as determined by ASTM Standard D7169-05, or its latest revision.
Positive written responses were received by most companies, and the topic has been discussed at the last three COQA meetings.

- NYMEX met with Cushing personnel in April 2011 to discuss adoption of the additional specs.
- At least two major terminal operators are routinely testing WTI/Domestic Sweet for the complete (NYMEX and COQA recommended) specifications.
Data from Plains indicates all of the recommended specifications are being routinely met.

Data from Enbridge for Marathon batches shows:

- Specifications for nickel, vanadium, carbon residue (MCR), and TAN are consistently being met.
- Questions on the HTSD data are being addressed.
MCR Results - All 31 samples are less than the 2.40 wt % max spec
Nickel Results - All samples are less than the 8 ppm max spec
Vanadium Results - All samples are less than the 15 ppm max spec
TAN Results - All samples are less than the 0.28 max spec
Conclusions

- The development of more comprehensive specifications to better define Domestic Sweet has been carefully built on proven, established practices.
  - LLS Specifications
  - Existing NYMEX specifications for gravity, sulfur, pour point, viscosity, RVP
  - Extensive relevant testing
Laboratory capabilities are available to readily, accurately monitor for these parameters.
While not unanimous, response has generally been favorable.
The COQA specs are meaningful to refiners; practical to implement; routinely achievable; and do not limit the liquidity of the stream.
COQA’s letter 15 months ago recommended the immediate adoption of these specs and subsequent work supports and validates this recommendation.