COQA Light Sweet Crude
Subcommittee Meeting - 10/21/20
Zoom Meeting

Website address: crudemonitor.us
Next meeting: TBD

Light Sweet Crude subcommittee discussion and planning meeting.

Highlights:

- Member Attendees
    - 43 persons in attendance
    - List at end of document

- Meeting Opening
    - Dennis S provided welcome statements to the meeting,
    - Noted that attendees could go into the meetings settings and adjust names if they would like to do so. Introduced functions, such as Chat.
    - Noted that as of the beginning of the meeting there were 37 attendees.
    - George Lywood is the Executive Assistant for the COQA, so Dennis S pointed out that if there are any technology, schedule, or other questions related to the meeting that it would be helpful to send either of them a private chat so that they could support.
    - At that point, the meeting was turned over to Aaron.

- Welcome, Agenda discussion, and review of items
    - Aaron noted that he thanked everyone for attending. It is a relatively new subcommittee. We would like to take another step after the last meeting to move forward some more on the items we have been discussing.
    - We have short agenda. We will talk about minutes from July meeting, talk about the Cushing specifications and related test methods, have a presentation on the Gulf Coast WTI specifications, and then discuss the FERC and CFR regulations.
    - Aaron pointed out that back in March, the discussions in the meeting were various covering from specifications through test methods, and such. We came away from the meeting with three buckets:
        - Cushing
        - Gulf Coast
        - Rules and Regulations
    - There was a lot of discussions on ASTM test methods at that time.
    - For this meeting, so that it does not get bogged down, what we would like to do is to focus on the Gulf Coast.

- Discussion on path forward around test methods
    - Aaron noted that at the end of the last meeting, we were left with a question if the subcommittee could work to inform the industry of new test methods.
    - There is so much information on test method surrounding what they are and what is happening. Could we establish a small committee around test methods, what we should do about it, and where we should go with it. Aaron asked: for those attending this meeting, if you would be interested in participating or coordinating, send a message to me, George, or Dennis (S). We can get with those who will be participating and then determine who would drive this. Should be those who have interest and background to do this, and they could assist in determining how to move this forward.
    - Aaron asked if anyone on the line would be interested in participating.
    - Frank, Arden, John, and Tyler volunteered their participation at the meeting. Nathan sent an email after the meeting indicating he wanted to volunteer.
    - Anthony confirmed that Frank would be a good choice for their company.
    - Aaron noted that if anyone is inclined to be involved, please follow up with him on volunteerism.
    - The conversation then turned to the WTI specification presentation.
    - Brant was introduced.

- Presentation on Gulf Coast WTI Specification
    - Brant expressed thanks to Tyler and his team for development of the presentation.
    - The purpose of the work was to gather specifications on WTI at points around the Gulf Coast (also includes information on Cushing).
    - Brant noted that Magellan worked to follow up on the review of specification and suggested that a next step would be for the committee to review, provide clarity, and correct mistakes if there are any. A goal would be for this committee to add on to all the areas more detail.
    - A list of many specifications was compiled. It takes a look at Houston, Corpus Christi, Nederland, Louisiana areas, etc. Starts with information on the Houston area specific with the Magellan East Houston terminal (MEH) and 3rd party barrels coming into it.
    - Brant described that in the middle of screen are averages of Longhorn, and BTX barrels; so, as Magellan allowed others to bring barrels in, Magellan decided to set specification so that people know what is acceptable.
    - Magellan determined the specification for the 1st column.
    - There is a quality certification agreement for suppliers to the MEH terminal to outline how a customer can meet those specifications and show how they can maintain the quality. The purpose is to go from a historical average to a set spec.
    - (still on slide 3 of presentation) Brant stated that: 'On the right I tried to capture some of the price indexes; contracts that are out there. There is the WTI Houston assessment by Argus based on Magellan's East Houston terminal, and Argus uses that to come up with indicators or better indexes. ICE has a swap contract called ACM and HTT from CME to set WTI differential for Houston. And there is the HOU futures contract deliverable to MEH. What we see is that these do not have a set specification.'

- There was discussion on product quality of Magellan at Houston, and Brant pointed to the center column, and indicated that it is what the industry is comfortable with from the online sites.
- Frank asked if they list methods or properties.
- Brant said they do list methods, but the methods are not in this presentation. He expressed he was willing to share spreadsheet with this group including methods for this group to provide feedback.
- Randy supported that the methods are on the webpage also.
- Brant affirmed and commented that the presentation has a hyperlink that goes to the webpage that has the methods.
- Frank asked if this presentation is available to the group at present. Brant responded that he was happy to share with the group via the minutes. (Presentation is attached in the Appendix)
- Nate asked what was meant by TBP D6377. What are the conditions that are being used for that?
- Brant deferred to Tyler as he has expertise in this area and would get back with a response.
- Frank suggested that it is probably crude pressure at 4:1 expansion and 100F. John said TBP is at the temperature of the area, maximum for the area. Doss said RVP is a calculation not a measurement. Terry indicated that it is 4:1. John clarified that TBP is 100F or 85F, and D6377 is actual vapor pressure of the crude
- Aaron noted that it is a great discussion, and suggested that due to time, we might return to the presentation. He asked Brant to continue.
- Brant described that the next part is the analysis of Enterprise from Midland to ECHO RCT No. 186.3.0 and Enterprise CME Houston called HCL. He noted that HCL does have some specific specifications shown in the presentation. Test methods were not noted on the website, but Enterprise might want to add that information to this discussion. Brant clarified that 'this is what we understand to be the Enterprise specifications.'
- Slide 5 is the other Houston area pipelines. The Magellan team looked at Gray Oak tariff and that is what is shown on the slide. Non pipelines are Argus AGS and Platts AGS markers, which was Houston expanded to Corpus Christi, Nederland, and the Texas City area. Argus AGS is normalized to ECHO. A majority of those trades have been Houston trades 95% MEH 4% Enterprise with 1 instance of Corpus Christi.
- Jeff asked what AGS indicates
- Brant responded that AGS stands for American Gulf Coast Select. He also noted that the intent of this information is not to draw a conclusion, but it is meant to clarify for all.
- Regarding the Platts information, not sure on the methods but they did have specifications on their website. AGS information is from multiple areas not just Houston, but a lot of it was Houston area. Continuing (slide 6) to the Nederland, Port Arthur, and Beaumont area, tariffs were identified and included in presentation.
- Covering the information Brant welcomed any clarification from anyone.
- The Corpus Christi area was covered, and the last slide is capturing other barrels that could be considered WTI. Could be Cushing through to the Gulf Coast. There is a

path for a barrel to Cushing and then to Houston and onwards that could be a (pure) barrel or blended barrel. The point is that there are various pathways. Also included in this slide the NYMEX DSW specification for comparison in the chart.
    - Brant noted that what we see in Houston could be different than what we see in Cushing as to what could be considered WTI. He stated that he appreciated all for allowing him to take the time to present and concluded.
    - Aaron responded to Brant that it was outstanding and gives us something to work toward. 'We have never seen the information in one location we appreciate it.'
    - Brant expressed thanks to Tyler and his team for pulling a lot of it together.

- Aaron moved the discussion to the FERC and CFR rules and regulations.
    - He suggested that this is more of an open discussion to end the day. Aaron commented that he would turn it over to Bill to continue.
    - Bill started by echoing Aarons response to Brent on the fabulous information in the presentation and noted that a next step would be to fill in what Brant has got.
    - It was noticed that there is a general lack of consistency on the extent of the specifications available. Bill suggested for the COQA to fill in those lines, and that it would be good to have a subgroup to look at the methods to fill in the lines on the list. From a point that 'Magellan has handed us the football and we can start running with it' Bill requested the group provide further comment.
    - Randy stated that a lot of it should be coordinated. It would be possible to make a graph on what this data represents and put on the website to put it out there for our members to consolidate. The members can have a go to place to look at the consolidation of this information. It could be on the crudemonitor websites or COQA.
    - Greg noted that keeping up with the specs is a nightmare, so it is good to have them in a consolidated form. 'It would be awesome. This is already better.'
    - Randy asked if we have enough people in the COQA that could keep this up to date.
    - Aaron suggested that we do have members and participants that are employees of the pipelines that could show their interests and so we would be able to. He asked for members to let either him, Dennis (S), Bill, or George know if they would be interested. If we could have volunteers going forward and review that over the next 30 days, it would be great. Aaron asked for further comment.
    - Bill noted that he concurred with what Randy said. The 'picture I have is that the COQA can share public information and we need to flesh out what Brant and Tyler put together. Tomorrow we have Platts discussing.' Bill suggested to get Enterprise and others involved.
    - Aaron responded that we could consider and fashion an email to go out to them. We could work on doing that. He agreed that we could put together the information from Brant and Tyler and work on it. It certainly frames good information.
    - Randy noted that if we could find a way to drill down on the information, it would really help to understand it better. 'Water content was significantly different, so then there are extensions to questions such as what if. What are the implications.'
    - Brant clarified that what was pulled for the presentation information were the tariff specifications and not the actuals. The tariff specifications have some water content that are <1% water and one that is <0.3%, but the actual numbers are about 0.06%.
    - The discussion concluded.

- Closing Remarks
    - Dennis S suggested that Dennis H has done a good job of communicating the minutes, so that if anyone would like a copy, they could send their contact information. (Several emails and chats were received, and list made.)
    - Aaron noted that we were able to cover all we wanted to today.
    - There was good input and communication, and a lot of action items to move this project forward.
    - He indicated that if anyone thinks of anything else please send a note.
    - We will endeavor to get the minutes out in about 30 days.
    - Aaron asked if there were any other questions.
    - He thanked all for attending the subcommittee meeting.
    - The meeting was adjourned

<u>Appendices to the Minutes (attached)</u>

- Presentation: Light Sweet Crude Subcommittee meeting (Crude Oil Quality Association, Zoom Meeting, October 21, 2020) [includes Agenda].
- Presentation: Gulf Coast WTI Specifications (Magellan; COQA Meeting, October 2020).

- Attendees
    - Aaron Dillard (Phillips 66)
    - Anthony Ciravolo (ExxonMobil)
    - Arden Strycker (SGS North America)
    - Bernardo Zimberg (Ancap)
    - Bill Lywood (Crude Quality Inc.)
    - Brant Easterling (Magellan Midstream)
    - Clint Bram (Citgo)
    - Dennis Haynes (Nalco Water)
    - Dennis Sutton (COQA)
    - Derek Kirby (Marathon Petroleum)
    - Devadas Panjala (Shell)
    - Flint Mathes (Intertek)
    - Frank Hagardorn (ExxonMobil)
    - Gary Sams (Schlumberger)
    - George Lywood (Crude Quality Inc.)
    - Greg Gilbert (Bureau Veritas)
    - Jason Hickman (Bureau Veritas)
    - Jeff Thompson (CVR Energy)
    - Jeffrey Burns (Clariant)
    - John Harkins (Energy Transfer)
    - Justin Jia (Husky)
    - Kesavalu Bagawandoss (Environmental Standards)
    - Leslie Chiazza (Enbridge)
    - Lin Li (Chevron)
    - Mindy Kuhn (Marathon Petroleum Company)
    - Nate King (Phillips 66)
    - Nathan Wreyford (Up Analytical)
    - Pat Swafford (CVR Refining)
    - Peter Colletti (EIA)
    - Randy Segato (Suncor)
    - Ranzy Morgan (Choice Analytical Inc.)
    - Rick Dobies (Phillips 66)
    - Rodrigo Barcia (Ancap)
    - Ron Bosch (Halliburton)
    - Ryan Davis (AMJ Energy)
    - Ryan Staub (AGAT Laboratories)
    - Sam Lywood (Crude Oil Quality, Inc.)
    - Scott Blakely (Intertek)
    - Scott Blumenshine (Flint Hills Resources)
    - Steve Haley (CHS Inc.)
    - Terry Thompson (Enterprise Products)
    - Tom Yeung (Hydrocarbon Publishing Company)
    - Tyler Caughman (Magellan Midstream)

LIGHT SWEET CRUDE SUBCOMMITTEE MEETING

CRUDE OIL QUALITY ASSOCIATION
OCTOBER 21, 2020

ZOOM MEETING

AGENDA

- Welcome
- Review LSC Meeting Minutes – July 30, 2020
- Cushing - Updating NYMX Specs – Test Methods
  - Could/should Subcommittee include a focus on informing industry of new and/or replacement test methods?
- U.S. Gulf Coast – WTI Specifications - Presentation
  - Tyler Caughman & Brant Easterling – Magellan Midstream Partners, L.P.
- FERC and CFR Rules and Regulations
  - Developing Spreadsheets / Databases
  - Websites with Rules & Regs

MAGELLAN MIDSTREAM PARTNERS, L.P.

Gulf Coast WTI Specifications

October 2020

Disclaimer

Magellan compiled the information in these slides from public sources and believes it to be true and correct. Magellan makes no representations or warranties as to the truth, correctness or completeness of the information in this presentation.

Houston Area – Magellan East Houston (MEH)

MAGELLAN			
Specifications	**MEH WTI Program**	**MEH WTI Actuals***	**Longhorn/BTX Tariff**
Reference	MEH-WTI Program	Provided by MMP (6mon avg)	RCT No.1.4.0 (LH) FERC No. 1.3.0 (BTX)
Grade	WTI	WTI	WTI
API, 60°F	41.0-43.5	42.2	36-44
Sulfur, %(m/m)	≤0.20	0.13	≤0.45
BS&W %(v/v)	≤0.30	0.06	≤1.0
RVP, psi	≤9.5	7.3	≤9.5
TVP, psi	≤11.0	6.7	≤11.0
Pour Point			
Iron, mg/kg	≤10.0	5.6	
Nickel, mg/kg	≤3.0	0.43	
Vanadium, mg/kg		0.29	
Organic Chlorides, mg/kg	≤1.0	<1.0	
Mercaptans, ppm wt	≤75	30	
H2S liquid, ppm wt	≤10	<1	
H2S vapor, ppm wt	≤500		
MCRT %(m/m)		0.57	
HTSD 20%	265	252	
HTSD 50%	525	510	
HTSD FBP	1315	1292	
Oxygenates, ppm wt	≤50	3.9	
Viscosity, cSt		2.8	
TAN, mg/KOH/g		<0.1	

***Product quality for HOU, ACM, HTT, and Argus WTI Houston are defined as Permian quality WTI at MEH. The average product quality is provided in the table above and monthly on Magellan's website, MEH-WTI Program**

Argus - WTI Houston:

Argus has stated that the Argus volume-weighted average for WTI traded at MEH is the most transparent indicator of value for the light grade at the U.S. Gulf coast. The physical volume of **WTI Houston** reported trades have averaged **~508,000 barrels per day** in 2020 (through Oct. del. period).

ICE - ACM and CME - HTT:

WTI Houston swap futures contracts that lock in the differential to WTI Cushing for WTI Houston. The current open interest is greater than **2,000,000 barrels** (or 200,000 lots).

ICE - HOU:

A physically settled Permian West Texas Intermediate (WTI) Crude Oil futures contract that is deliverable into MEH.

Houston Area - Enterprise

ENTERPRISE		
Pipelines	**Midland to ECHO**	**HCL Specifications**
Reference	RCT No 186.3.0	CME-HCL Specifications
Grade	WTI	WTI
API, 60°F	38-44	40-44
Sulfur, %(m/m)	<0.40	≤0.20
BS&W %(v/v)	≤1.0	≤1.0
RVP, psi	≤9.0	≤9.5
TVP, psi		
Pour Point		≤50
Iron, mg/kg		
Nickel, mg/kg	≤3.0	≤3.0
Vanadium, mg/kg		
Organic Chlorides, mg/kg	≤3.0	
Mercaptans, ppm wt		
H2S liquid, ppm wt		
H2S vapor, ppm wt		
MCRT %(m/m)	≤0.85	≤2.4
HTSD 20%		
HTSD 50%		
HTSD FBP		
Oxygenates, ppm wt		
Viscosity, cSt	-	≤60 (SUS)
TAN, mg/KOH/g		≤0.28

CME - HCL:

Crude oil futures contract offering physical delivery to the ECHO terminal, EHSC terminal, Enterprise Genoa Junction, or Enterprise Moore Road.

Other Houston Area – WWP, Gray Oak, AGS

	WINK TO WEBSTER	PHILLIPS 66	PLATTS	ARGUS
Pipelines	**WWP**	**Gray Oak - JT w/KMCC**	**AGS Specifications**	**AGS Specifications**
Reference		FERC No. 1.1.0	Platts - AGS Specifications	
Grade	WTI	WTI	WTI	WTI
API, 60°F	No Active Tariff Could Exxon provide?	37-44	40-44	No Specifications
Sulfur, %(m/m)		≤0.45	0.20	
BS&W %(v/v)		≤1.0	≤1.0	
RVP, psi		≤9.5	≤9.5	
TVP, psi		≤11.0		
Pour Point				
Iron, mg/kg			≤10	
Nickel, mg/kg			≤2.0	
Vanadium, mg/kg			≤2.0	
Organic Chlorides, mg/kg				
Mercaptans, ppm wt			≤75	
H2S liquid, ppm wt				
H2S vapor, ppm wt				
MCRT %(m/m)				
HTSD 20%				
HTSD 50%				
HTSD FBP				
Oxygenates, ppm wt				
Viscosity, cSt				
TAN, mg/KOH/g				

Argus - AGS:

The Argus AGS Marker and the Argus AGS index represent the volume-weighted average of trades done in a given trade day for Midland-quality WTI at Gulf coast locations in Houston, Corpus Christi, and Nederland. All trades are normalized to Enterprise ECHO terminal using spreads based on observed historical transactions. Currently MEH accounts for ~95% of the reported trades, ~4% Enterprise ECHO, ~1% all other locations.

Platts - AGS:

Reflects the value of light sweet crude oil loading 15-45 days forward on an FOB basis from locations along the US Gulf Coast including Houston, Corpus Christi, Beaumont, Nederland, Texas City, and Port Arthur, with the most competitive location on a cargo-size normalized basis setting the price assessment.

Nederland, Port Arthur, and Beaumont Area

	ENERGY TRANSFER PARTNERS		SHELL	SEAWAY	WINK TO WEBSTER
Pipelines	**Amdel**	**Permian Express**	**Zydeco**	**ECHO to Nederland**	**WWP**
Reference	FERC No. 178.12.0	FERC No. 5.5.0 (PE 1) No. 3.9.0 (PE 2&3) No. 5.3.0 (PE 4)	FERC 1.3.0	RCT No. 33.7.0	
Grade	NYMEX Spec	WTI	WTI	WTI	WTI
API, 60°F	37-42	38-45		17-90	No Active Tariff Could Exxon provide?
Sulfur, %(m/m)	≤0.42	≤0.45			
BS&W %(v/v)	≤1.0	≤1.0	≤1.0	≤1	
RVP, psi	≤9.5	≤9.5	≤8.6	≤9.0	
TVP, psi		≤11.0			
Pour Point					
Iron, mg/kg					
Nickel, mg/kg					
Vanadium, mg/kg					
Organic Chlorides, mg/kg				≤3.0	
Mercaptans, ppm wt					
H2S liquid, ppm wt					
H2S vapor, ppm wt					
MCRT %(m/m)					
HTSD 20%					
HTSD 50%					
HTSD FBP					
Oxygenates, ppm wt					
Viscosity, cSt				≤350	
TAN, mg/KOH/g					

Corpus Christi Area

	EPIC	PLAINS	PHILLIPS 66
Pipelines	**EPIC**	**Cactus 1 & 2**	**Gray Oak**
Reference	FERC No. 2.0.0	FERC No. 1.4.0	FERC No. 1.1.0
Grade	WTI	WTI	WTI
API, 60°F	36-44	38-44	37-44
Sulfur, %(m/m)	≤0.45	≤0.42	≤0.45
BS&W %(v/v)	≤1.0	-	≤1.0
RVP, psi	≤9.5	≤9.0	≤9.5
TVP, psi	≤11.0		≤11.0
Pour Point			
Iron, mg/kg			
Nickel, mg/kg			
Vanadium, mg/kg			
Organic Chlorides, mg/kg			
Mercaptans, ppm wt	≤75		
H2S liquid, ppm wt			
H2S vapor, ppm wt	≤10.0		
MCRT %(m/m)			
HTSD 20%			
HTSD 50%			
HTSD FBP			
Oxygenates, ppm wt			
Viscosity, cSt			
TAN, mg/KOH/g			

WTI through Cushing to the Gulf Coast

	LOTUS	PLAINS	ENTERPRISE	TC ENERGY	PLAINS	MARATHON	CME WTI
Pipelines	**Centurion**	**Basin**	**Seaway**	**Marketlink**	**Diamond**	**Capline**	**Cushing, OK**
Reference	FERC No. 35.6.0	FERC No. 71.13.0	RCT No. 187.5.0	FERC No. 1.6.0	FERC No. 2.3.0		CME NYMEX - WTI/DSW Specifications
Grade	Crude	Crude	Light Crude	Crude	Crude		WTI/DSW
API, 60°F	18-89.9	<78.9	38-44	19-64	<78.9	No Active Tariff Could Marathon provide?	37-42
Sulfur, %(m/m)			≤0.42				≤0.42
BS&W %(v/v)	≤1.0	≤1.0	≤1.0	≤0.50	≤1.0		≤1.0
RVP, psi	≤10.0	≤9.0	≤9.0		≤9.0		≤9.5
TVP, psi				≤10			
Pour Point							≤50
Iron, mg/kg							
Nickel, mg/kg							≤8
Vanadium, mg/kg							≤15
Organic Chlorides, mg/kg							
Mercaptans, ppm wt							
H2S liquid, ppm wt							
H2S vapor, ppm wt							
MCRT %(m/m)							≤2.4
HTSD 20%							≤220 (<19%)
HTSD 50%							470-570 (<50%)
HTSD FBP							>1020 (<16%)
Oxygenates, ppm wt							
Viscosity, cSt				≤350			60(SUS)
TAN, mg/KOH/g							≤0.28