Summary - Platts Crude Oil Export Summit

Houston, October 28-30 2019

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Agenda Topics for the Summit

➢ The Long Term Market Outlook – BP and World Energy Council
➢ US Crude Oil Quality Challenges – Panel Discussion
➢ US Export – Light Sweet Supply in the Global Market
➢ Canadian Exports – Prospects for Asian export
➢ Export Infrastructure – Panel Discussion
➢ US Pricing – Arbitrage and “Fear Premium”
➢ How Disruptive is WTI to the North Sea Crude Scene
➢ Outlook for VLCCs in an Export Driven Market
➢ The Future of American Crude Exports

DETAILED PRESENTATIONS AVAILABLE UPON REQUEST
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- FTSE 100 listed on the London Stock Exchange
- Combined with Schneider Electric software business on 1 March 2018
- Schneider Electric is a Strategic Partner and 60% shareholder of AVEVA
- Growing recurring revenue and margins
- Market capitalization >£8bn
- Revenue >£760m

Revenue by Industry

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- Power 11%
- CPG 11%
- EPC 10%
- Marine 7%
- General 6%
- Water 5%
- Mining 4%
...helping our Client lead with digital innovation

Collaborate

We harness the power of our ecosystem by working together to bring bold ideas to life.

- 16,000+ customers
- 10+ industries
- 4,600+ employees
- 4,200 partners

Create

We build leading solutions across the asset and operations lifecycles that turn opportunity into business value.

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- Monitor and Control
- Plan and Schedule
- Operate and Optimize
- Engineer Procure Construct

Pioneer

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- 20% reduction in capital projects
- 100+ million saved from preventing asset downtime
- 30%+ improvement in overall equipment effectiveness
- 20%+ Increase in efficiency

4,200 partners
The Long Term Market Outlook – BP Energy Outlook

Outlook scenarios focus on 3 variables;
1) Oil demand, 2) CO2 emissions and 3) OPEC response to 1+2

• US Tight Oil production plateau in 2025
• Supply gap if production investments get limited OR price goes much below $50/bbl
• 85% of the incremental energy provided (Nat. Gas) is “cleaner” than current supply
• Declining oil demand from the transport sector from 2020-2040
• Single use plastic BAND => significant impact on decline in oil demand
• China will escalate imports and US still import 10 MMBD due to refinery configurations
• Incremental oil production exported as US refineries are “maxed out” on sweet crude
The Long Term Market Outlook – World Energy Council

Outlook focused on Saudi’s role in the world market

- OPEC do not control the market anymore. Small Saudi production cut in December 2019 meeting => no major influence.
- Recent Saudi production came off the market and no one cared – current build in political risk estimated to around $10/bbl
- Most critical risk element Strait of Hormuz (20 MMBD transported through)
- Saudi and Russia wants to see $70/bbl oil price and also defend the market share
- Saudi 2.5 MMBD of spare capacity not really available
- Most middle east economies still very dependent on oil revenue
- Iraq is the single largest contributor to adding production closer to 2040
Quality is crucial; one bad cargo can lead to exclusions from NOC tenders and limit trader interest.

Stable WTI quality will transform the global market. Nearly 7 million barrels per day of WTI-type crude oil produced in Permian, Eagle Ford, Bakken, DJ Niobrara, and Oklahoma.
US Crude Oil Quality Challenges – Panel Discussion

Panel focus on FOREIGN refineries need to know what they get from US crude cargoes

- Crude oil contracts are still written with lack of quality specification “normal export quality”. Significant Batch to batch quality variability is observed for several grades.
- Contaminants not normally in conventional oil has been reported in shale export cargoes and created “uncertainty” from some Asian and European buyers.

Panel participants agreed on 2 main goals:

1) **STABILITY** of the export grade e.g. ensure confidence in the “brand name” Bakken, WTI, MEH etc. even if it means investment in additional tanks for segregation.

2) **TRANSPARENCY** of quality data – ECHO terminal publish weekly quality data, ICE has Permian (WTI) data from Magellan, CME group reviews COQA spec. for WTI Cushing.
US Crude Oil Quality Challenges – panel discussion continued
Panel focus on FOREIGN refineries’ need to know what they get from US crude cargoes

- ETP has created a “balanced” quality specification they believe satisfied both producers, shippers, traders and refiners. Goal is to export a “pure” Bakken quality => no blending.

- Main quality issue with streams from the Permian and Bakken => RVP spec. “ok” in the north but off spec. when reaching the USGC

- Wax in Eagle Ford? The use of flow improvement additives seems to work fine

- Permian has enough takeaway capacity to move new production directly to export

- If needed in the future OIL pipelines will likely be converted to GAS => repurpose of infrastructure
US Export – Light Sweet Supply in the Global Market

Plenty of refining capacity globally to process the light sweet barrels

• “No fear” in the global market due to the shale oil and gas (LNG) production/export

• Q: Does the foreign customer want a “bespoke” or look-alike blended barrel?  
  A: No, refiners prefer the “real brand name grade” and create blends themselves

• Low inventory level globally but Asia has good storage capacity to “buffer disruptions”

• Forward curves in 2020 shows Freight more expensive. Freight will become a more significant element in the Margin calculations going forward

• WTI was fundamentally a Cushing contract but now that is changing

• MEH better quality than BFOE (the Brent basket)
Canadian Exports – Prospects for Asian export

Negative view on short term prospect for Canadian producers to move oil out of Canada

- 96% of the oil produced in Canada goes to the USA
- Politically it is now more difficult than ever to get any pipeline project approved by the government. This causes investment capital to flee from Canada.
- Production projects are 20 years stable projects => VERY different from shale projects.
- Canada struggling to get ONE LNG terminal build on the west coast although 15 was proposed.
- The tanker ban imposed will kill the Northern Gateway pipeline.
Export Infrastructure – Panel Discussion

What risk does USGC face as a global export hub for oil?

<table>
<thead>
<tr>
<th>Corpus Christi is the Preferred Export Hub</th>
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<tbody>
<tr>
<td>Proximity to Incremental Production</td>
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<tr>
<td>Nearest open water for Permian and Eagle Ford volumes</td>
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<tr>
<td>Advantaged Pipeline Connectivity</td>
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<td>Lowest cost “Wellhead to Water”</td>
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<tr>
<td>“Straight Shot” Infrastructure</td>
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<tr>
<td>No middleman and no ‘fee-stacking’</td>
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<tr>
<td>Superior Quality Control</td>
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<td>Segregated storage and infrastructure keeps barrel ‘neat’</td>
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<tr>
<td>Marine Logistics</td>
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<td>Limited congestion, proximity to open water, quick turnaround times</td>
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- **Today** 45% of exported volume is loaded onto VLCC’s via **revers lightering**. In the future more offshore VLCC capabilities will provide the necessary loading capacity.
During the coming decade, optimal marketing of U.S. light, tight oil will possibly require international deliveries via as many as several hundred VLCCs.

Growing export of LNG through the Panama Canal may result in a “congested transportation route”.

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US Pricing – Arbitrage and “Fear Premium”

Fear premium = low and export infrastructure is building quickly => not yet a bottleneck

Managing Risks and Uncertainties Over Oil Price Direction

The “Spring-2019” Evolving Market Mindset

- U.S. oil production recently at almost 12 million barrels per day (and quite possibly still growing) is likely to provide a continuing challenge to both Russia and Saudi Arabia, an extraordinary event!
  - Saudi / Russia price needs $75 - $80+ / Bbl
  - U.S. remains very competitive at $65 / Bbl or higher
  - OPEC viability increasingly questionable below $50 / Bbl

- Geopolitical uncertainties have risen significantly
  - U.S. / China trade agreement???
  - Russia sanctions?
  - Middle East continuing with potentially intensifying turmoil?

- Energy price volatility has been re-triggered
  - Permian takeaway capacity
  - Deficient U.S. export infrastructure (the relevant markets are international)
  - Iranian sanctions enforcement continues

- Longer term, the much improved state of U.S. oil strategic positioning should afford a key competitive U.S. advantage
How Disruptive is WTI to the North Sea Crude Scene?

Increased US export to Europe

- US crude competes with European grades for long-haul demand but DTD Brent not impacted much for the latest export flow of WTI.
- Brent is less than 1MMBD and continues to fall => maybe include CIF Rotterdam positions for the pricing of Brent basket
- Forties in high demand in Asia.
- West African export to Latin America drops ~24,000 b/d (-26%) from 2018 to 2019
- Little West African export to Asia, WTI has replaced it.
- WTI Midland too much naphtha for the European refiner (looks like Ekofisk) => not enough Petrochemical facilities in Europe.

Johan Sverdrup (medium sulfur north sea grade) might become a part of the Brent Basket OR it might replace Urals in NWE. It loads on VLCC from Mongstad refinery in Norway.
Outlook for VLCCs in an Export Driven Market

Americas is a “front loading market” very much influenced by the World Freight Market

- There will be NO bottleneck from the terminals in handling the crude export volumes or VLCCs. Loading capacity per day = 6MMBD => more than needed

- Freight assessments will be made on IMO2020 compliant vessels

- Q: Will the bottleneck be traffic “congestion” in the port of Houston? A; NO, because the VLCCs will load offshore.
The Future of American Crude Exports

Estimated Shale growth of 1MMBD for the next 5-10 years

- Global Supply Larger and Lighter. Quality disruptions from NGL and Condensate volumes
- Exports – More help is on the way from existing terminal expansions
- Harder to get heavier feedstock for upgrading units. Hydrocracker not running full capacity even when margins are good..
- Growth disruptions; #1 – Oil price below $50/bbl, #2 – Geological/drilling technology, #3 Demand recession
Offshore supply steady -- underinvestment not apparent
Offshore -- 20 MBD of peak capacity at $50 Brent
ABOUT AVEVA

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