Dan Tsubouchi
Principal, Chief Market Strategist
(403) 606-5584
dtsubouchi@streamasset.ca

Ryan Dunfield
President, Managing Principal
(403) 984-1942
rdunfield@streamasset.ca

Aaron Bunting, CA, CFA
Principal, CFO
(403) 984-1944
abunting@streamasset.ca

Warren Robinson
Originations
(403) 984-1943
wrobinson@streamasset.ca

Ryan Haughn, CFA
VP Investments
(403) 984-1945
rhaughn@streamasset.ca

Alan Cooper, CA, CFA
VP Investments
(403) 984-1941
acooper@streamasset.ca

Wylie Johnston
Sr. Analyst, Investments
(403) 993-8130
wjohnston@streamasset.ca

Brian Zisin
Analyst
(780) 716-2696
bzisin@streamasset.ca

Zach Lelek
Analyst, Valuations
(403) 808-6229
zlelek@streamasset.ca

Energy Tidbits

Nov 11, 2018

Produced by: Dan Tsubouchi

Did Trump Signal Iran Waivers Could Be Extended If Needed To Keep Oil Prices Down?

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo and energy blogs. The focus and concept for the memo was set in 1999 with input from PMs, who were looking for research (both positive and negative items) that helped them shape their investment thesis to the energy space, and not focusing on day to day trading. Our priority was and still is to not just report on events, but interpret and point out implications therefrom. The best example is our review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector and not just a specific company results/guidance. Our target is to write on 48 to 50 weekends per year and to send out by noon mountain time.

This week's memo highlights:

1. Trump's post midterms comment on Iran sanctions seemed to point to keeping oil prices down is a higher priority than inflicting maximum pain on Iran (Click Here)

2. TransCanada's Coast GasLink startup in 2023 supports the timing for LNG Canada to deliver its first LNG to Japan for Apr 1, 2024 (Click Here)

3. Good NOAA explanation of how El Nino forecasts are probabilistic ie. why El Nino winters can be cold (Click Here)

4. The EIA increased its 2019 US oil production forecast by 300,000 b/d Oct despite running a $5/b lower WTI oil price thru its forecast model (Click Here)

5. Looks like more delays for Keystone XL with the judge's ruling (Click Here)

6. Excellent insights on Cdn crude by rail from CN this week (Click Here)

7. Fort Hills and Kearl outperformance in Oct/Nov has been another negative to WCS in the last month (Click Here)

8. For new readers to our Energy Tidbits and our blogs, you will need to sign up at our blog sign up to receive future Energy Tidbits memos. The sign up is available at [LINK].

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Natural Gas – YoY storage deficit narrows to 580 bcf to start the winter

The theoretical summer refill season has now ended with a 65 bcf injection this week for storage to reach 3.208 tcf as o f Nov 2, which is 580 bcf lower YoY to start the winter. The current storage of 3.208 tcf is also 621 bcf lower than the 5 year average. Below is the EIA's storage table from its Weekly Natural Gas Storage Report [LINK]

YoY storage deficit is 580 bcf to start the winter

Figure 1: US Natural Gas Storage

	Stocks billion cubic feet (Bcf)				Historical Comparisons			
					Year ago (11/02/17)		5-year average (2013-17)	
Region	11/02/18	10/26/18	net change	implied flow	Bcf	% change	Bcf	% change
East	831	826	5	5	925	-10.2	919	-9.6
Midwest	980	956	24	24	1,111	-11.8	1,093	-10.3
Mountain	182	180	2	2	224	-18.8	219	-16.9
Pacific	265	262	3	3	317	-16.4	351	-24.5
South Central	949	919	30	30	1,210	-21.6	1,246	-23.8
Salt	253	234	19	19	334	-24.3	346	-26.9
Nonsalt	696	686	10	10	876	-20.5	900	-22.7
Total	**3,208**	**3,143**	**65**	**65**	**3,788**	**-15.3**	**3,829**	**-16.2**

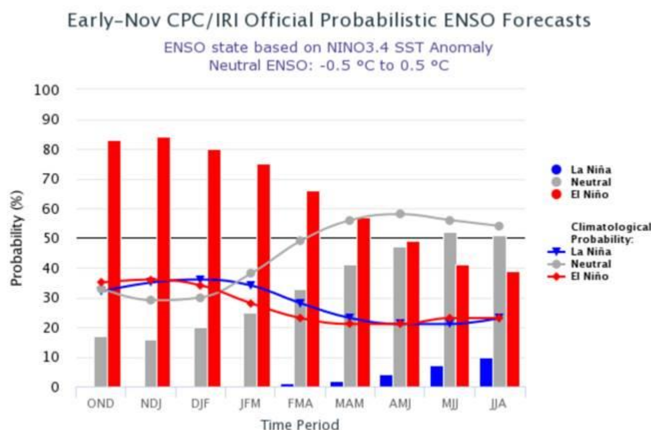
Source: EIA

Natural Gas – NOAA sees ~80% probability of a "weak" El Nino winter

NOAA issued its updated monthly El Nino outlook on Thurs [LINK] and, once again, increased the probability for an El Nino winter vs last month's forecast. This month, they call for a ~80% chance for an El Nino winter, vs 70-75% in the Oct update and 65-70% in the Sept update. NOAA published its monthly El Nino outlook on the 2nd Thurs of each month. But NOAA also noted that it is expected to be a weak El Nino. NOAA wrote "*El Niño is expected to form and continue through the Northern Hemisphere winter 2018-19 (~80% chance) and into spring (55-60% chance). …. The majority of models in the IRI/CPC plume predict a Niño3.4 index of +0.5°C or greater to continue through the rest of the fall and winter and into spring [Fig. 6]. The official forecast favors the formation of a weak El Niño, with the expectation that the atmospheric circulation will eventually couple to the anomalous equatorial Pacific warmth. In summary, El Niño is expected to form and continue through the Northern Hemisphere winter 2018-19 (~80% chance) and into spring (55-60% chance; click CPC/IRI consensus forecast for the chance of each outcome for each 3-month period).*" Below is the "Early-Nov CPC/IRI Official Probabilistic ENSO Forecasts" graph. [LINK]

~80% probability for a weak El Nino winter

Figure 2: Early Nov CPC/IRI Official Probabilistic ENSO Forecasts



Source: International Research Institute For Climate And Society

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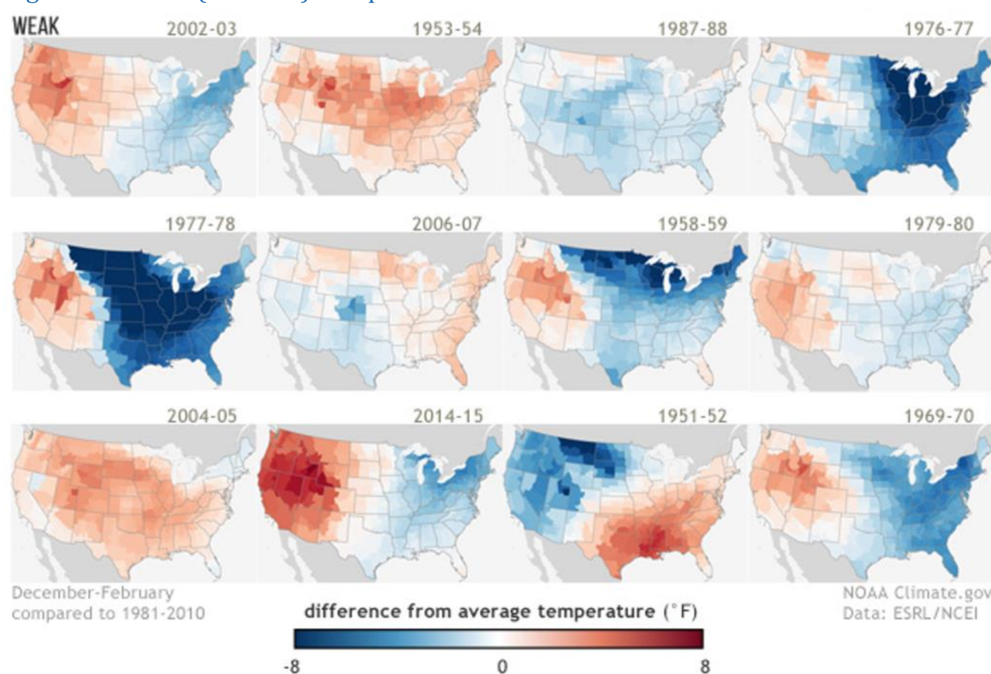
Natural Gas – Weak El Ninos can be very cold

Weak El Nino can bring cold winters

We normally include a reminder that El Nino winters aren't always warmer than normal and for the past two years, we referenced a NOAA Feb 2016 brief "*Winter temperature patterns for every El Niño since 1950*". We checked the link this weekend [LINK], it works, but NOAA updated the brief on Oct 24, 2018. The key maps (pasted below) were unchanged and also included in a good NOAA Oct 22 brief NOAA's Winter 2018/2018 outlook. This short outlook is worth a read as it explains the probabilistic nature of winter temperature forecasts as well as including the key maps on winter temperatures vs strong/moderate/weak El Ninos. (i) Probabilistic forecasts. NOAA explains "*these forecasts are provided in terms of probabilities (% chance) for below, near, or above average outcomes with the maps showing only the most likely outcome (1). Because the probabilities on these and all CPC outlook maps are less than 100%, there is no guarantee you will see temperature or precipitation departures from normal that match the color on the map. As we've explained in earlier blog posts, even when one outcome is more likely than another, there is still always a chance that a less favored outcome will occur. And in fact, for the forecasts to be reliable (a critical part of a probabilistic forecast), less likely outcomes MUST happen from time to time*". (ii) Good reminder from NOAA two weeks ago [LINK] that for the key Midwest/northeast/atlantic regions "*indicate probabilities between 33-50%, meaning that the forecast only tilts modestly towards above normal temperatures.*" The brief also reminds that, historically, weak El Nino (like being predicted this year) winters can be colder than normal. (iii) The outlook includes the key historical maps that show the correlation since 1950 of a winter El Nino strength (strong, moderate, weak) vs the actual winter temperature. Our Supplemental Documents package includes the NOAA Winter 2018-2019 outlook. [LINK]

Figure 3: Winter (Dec-Feb) Temp In Weak El Ninos Since 1950



Source: NOAA

Natural Gas – EIA increases 2019 US gas supply forecast by 1.85 bcf/d vs Oct forecast

EIA increases 2019 forecast by 1.85 bcf/d

No surprise to see the EIA increase its natural gas supply forecast for 2018 and 2019 in this week's EIA Short Term Energy Outlook Nov 2018. HH prices continue to be driven by the YoY storage deficit and he outlook for near term cold weather in the US. Otherwise, the STEO would have been negative to HH gas prices. (i) The EIA made big increases to the EIA's historical natural gas supply and increasing forecasts for both 2018 and 2019. (ii) Increased 2018 forecasts big, up 0.56 bcf/d to 83.23 bcf/d. But the increases were bigger to Q3/18 up

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0.56 bcf/d to 84.92 bcf/d and to Q4/18 up 1.70 bcf/d to 87.54 bcf/d (was 84.92 bcf/d after the upward revision). bcf/d). This is a big increase at this time of year, and it is mostly due to big revisions to Q3/18 of +2.35 bcf/d and Q4/18 of +2.94 bcf/d. They don't give any reason but it was expected given the increasing oil production forecasts diving big increases in associated natural gas from oil wells. (iii) Increased 2019 forecast big. +1.85 bcf/d vs Oct. This is a big increase. But note that the Nov STEO is now up 4.93 bcf/d vs the Sept forecast. There was no reason, but it has to be linked to the oil production forecast. (iv) These increases are more impressive because the EIA assumes lower HH gas prices. This month, they used HH $2.98 vs $3.12 used in the Oct STEO. (v) The YoY increases are 8.46 bcf/d in 2018 vs 2017, and 6.35 bcf/d in 2019 vs 2018. Our Supplemental Documents package includes the excerpts from the EIA Short Term Energy Outlook Nov 2018.

Figure 4: EIA STEO US Natural Gas Supply Forecasts By Forecast Month

bcf/d	2017	Q1/18	Q2/18	Q3/18	Q4/18	2018	Q1/19	Q2/19	Q3/19	Q4/19	2019
Nov 2018	74.77	79.14	81.19	84.92	87.54	83.23	88.85	88.49	89.78	90.17	89.58
Oct 2018	74.77	79.14	81.21	84.36	85.86	82.67	86.83	87.36	87.91	88.80	87.73
Sept 2018	73.55	78.46	80.38	82.01	82.92	80.96	83.87	84.53	84.84	85.35	84.65
Aug 2018	73.57	78.50	80.50	82.20	82.13	81.10	83.88	84.15	84.09	84.28	84.10
July 2018	73.57	78.53	80.95	82.44	83.37	81.34	84.11	84.37	84.46	84.97	84.46
June 2018	73.57	78.54	81.31	82.05	82.83	81.20	83.73	83.79	83.68	83.93	83.78
May 2018	73.57	78.49	80.31	81.15	81.85	80.46	83.03	83.46	83.42	83.39	83.33
Apr 2018	73.57	78.32	80.62	82.17	83.14	81.08	83.14	82.79	82.54	82.70	82.79
Mar 2018	73.60	80.33	81.57	82.36	82.52	81.70	82.59	82.48	82.59	83.00	82.67
Feb 2018	73.57	78.68	79.56	80.95	81.94	80.30	82.37	82.52	82.90	83.62	82.86
Jan 2018	73.57	79.29	80.13	81.04	81.19	80.42	81.80	82.55	83.42	84.30	83.02

Source: EIA Short Term Energy Outlook

Natural Gas – EIA increases its 2019 storage estimate with higher production

EIA increases its 2019 storage forecast

The big variable for 2019 gas storage remains the winter weather. But absent the EIA looking differently at winter, its increasing natural gas supply forecasts mean that it is increasing its estimate of gas storage levels in 2019. (i) The EIA"s starting point for its 2019 storage forecast (its estimate for 2018) is close to the actuals. The STEO forecast storage to be down 16% YoY at Oct 31, but way higher YoY in 2019. (ii) For Oct 31, 2018, The "*EIA estimates that U.S. natural gas storage inventories were 3.2 trillion cubic feet (Tcf) at the end of October. This level was 16% lower than both the 2017 end-of-October level and the five-year (2013–17) average for the end of October and was the lowest end-of-October level since 2005"*. As noted above, the actual was down 15% YoY. (iii) But the EIA forecasts 2019 storage up 389 bcf in calendar 2019 with higher production. Please note in the blow table, the EIA only provides specific storage estimates in bcf for calendar year end and not Nov 1.

Figure 5: EIA Estimated Working Gas In Storage End Of Calendar Period Forecast (bcf)

bcf	2017	2018	2019
Nov 2018	3,033	2,701	3,060
Oct 2018	3,033	2,800	2,671
Sept 2018	3,033	2,767	2,640
Aug 2018	3,033	2,801	2,674
July 2018	3,032	2,972	2,859
June 2018	3,032	2,950	2,862
May 2018	3,032	2,936	2,834
Apr 2018	3,034	3,225	2,941
Mar 2018	3,039	3,258	2,971
Feb 2018	3,059	3,193	2,939
Jan 2018	3,120	3,254	3,047

Source: EIA Short Term Energy Outlook

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Natural Gas – Japan LNG import prices continue to be up strongly YoY

We continue to see data points to support the stronger 2017/2018 LNG market with Japan LNG prices up strongly YoY. Japan's Ministry of Economy, Trade and Industry (METI) published its monthly Japan LNG import price data for Oct. METI says that Japan contract spot LNG prices were $10.70/mmbtu in Oct, basically flat to Sept of $10.60 and Aug of $10.70 . But Oct prices are up 30.5% YoY vs $8.20 in Oct 2017. Japan LNG import data should be coming out in the next week, and Japan LNG import volumes have been fairly flat YoY. Our Supplemental Documents package includes the METI release [LINK].

Japan LNG import Oct prices up 30.5% YoY

Figure 6: LNG Contract Based Price in Japan $/mmbtu

	2014	2015	2016	2017	2017/2016	2018	2018/2017
Jan		$10.20	$7.10	$8.40	18.3%	$11.00	31.0%
Feb		$7.60	$6.50	$8.50	30.8%	$10.60	24.7%
Mar	$18.30	$8.00	n/a	$6.30	n/a	$8.80	39.7%
Apr	$16.00	$7.60	$4.20	$5.70	35.7%	$9.10	59.6%
May	$14.80	n/a	$4.10	$5.70	39.0%	$8.20	43.9%
June	$13.80	$7.60	n/a	n/a	n/a	$9.30	n/a
July	$11.80	$7.90	$5.80	$5.60	-3.4%	$10.00	78.6%
Aug	$11.40	$8.10	n/a	$5.80	n/a	$10.70	84.5%
Sept	$13.20	$7.40	$5.70	$6.90	n/a	$10.60	53.6%
Oct	$15.30	$7.60	$6.10	$8.20	34.4%	$10.70	30.5%
Nov	$14.40	$7.40	$7.00	$9.00	28.6%		
Dec	$11.60	$7.40	$8.00	$10.20	27.5%		

Source: Japan Ministry of Economy, Trade and Industry

Natural Gas – TRP's Coastal GasLink supports LNG Canada first LNG in early 2024

It looks like we saw more support for first LNG from LNG Caanda in early 2024 from TransCanada's Q3 call last Thurs. TransCanada gave a good update on its Coastal GasLInk that will deliver gas to LNG Canada. Coastal GasLink recap includes C$6.2b, initial capacity of ~2.1 bcf/d, potential expansion up to 5 bcf/d. Construction expected to begin in early 2019 with planned in service date of 2023, most of construction spend is 2020 and 2021. Also note they are going ahead with construction even with the NEB intervenor question. In the Q&A, mgmt. replied "*Hey, Ben, this is Karl. Let me just start by saying TransCanada is disappointed with the NEB decision to move forward to review jurisdictional matters here. We do know they have a job to do and we will be cooperating with the job and participating in that hearing. But I will say that we have valid permits from an appropriate regulatory agency right now and we do intend to continue our construction process for this project as we speak. If something happens in the future where a jurisdiction does change before we finish construction, then we would expect a seamless transition of the premise, just like we have experienced in other jurisdictional changes through the last history of TransCanada. So, from our perspective, we will cooperate and work with this hearing that they're going to have on the jurisdictional matters, but we will also be starting our construction with the permits that we have*." Coastal GasLink timing to be in service in 2023 ties to our view that LNG Canada plans to deliver LNG to Japan for Apr 1, 2024. Recall that Shell and LNG Canada have only said start up before the middle of the next decade ie. before 2025. Whereas our Oct 14, 2018 Energy Tidbits noted "*Toho Gas Group announced it signed a heads of agreement with Mitsubishi to purchase LNG from the LNG Canada "from FY2024*". Elsewhere on the Toho website, they note "FY2017 (April 1, 2017-March 31, 2018), which then suggests FY2024 starts April 1, 2014. Our Supplemental Documents package includes excerpts from the TransCanada Q3 call transcript.

Coastal GasLink in service in 2023

Natural Gas – High natural gas prices are leading to more Europe use of coal

It may not be a material impact, but we have to believe the higher than expected global LNG prices are causing some demand substitution, in particular by coal in Asia and in Europe. Our Oct 28, 2018 energy Tidbits noted the comments by CN and Scorpio Bulkers on increased thermal coal to the Gulf Coast for Europe. Later in the memo, we note comments from CN

Increasing thermal coal to Europe

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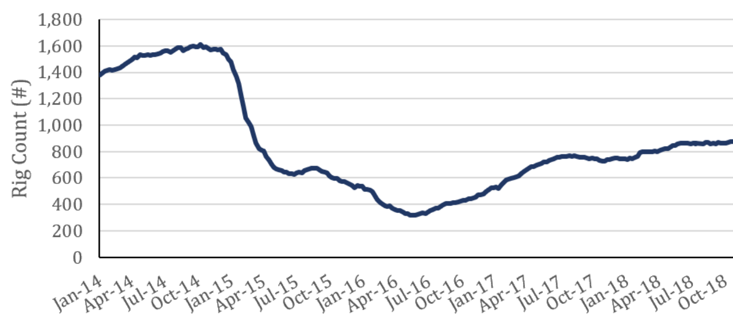
mgmt. this week of these increased thermal coal volumes to the Gulf Coast and their visibility for this to continue in 2019. We were reminded of this natural gas cost issue this week in a Platts story "*German coal phase-out 'will not happen before 2030': VIK CEO*" [LINK] that noted "*Gas currently uncompetitive with coal on price*", "*The phase-out of coal from German industry will not happen before 2030 due to several factors stifling the move towards natural gas, Barbara Minderjahn, CEO of VIK-the German Association of Industrial Energy Consumers, said at the European Autumn Gas Conference in Berlin Friday. Minderjahn said the total phase-out of coal would not begin until 2022-25 and "won't happen before 2030." "The trouble is pricing. Coal is a lot cheaper than gas for both industry and for power generation," Minderjahn said, and that any near-term change would not occur "if the problem of gas being more expensive than coal is not solved."*"

Oil – US oil rigs +12 to 886 oil rigs, Permian oil rigs were +5 oil rigs

US oil rigs were +12 this week

It is a bit of a surprise to see the big increase in US oil rigs given the consistent comments from service company Q3 calls on exhausted 2018 capex budgets and potential for an extended holiday break in drilling. Baker Hughes reported that US oil rigs were +12 to 886 oil rigs as of Nov 9. Increases were in Others +15, Permian +5, DJ Niobrara +2 and Williston +1. Decreases were in Cana Woodford -9 and Eagle Ford -2. Below is our graph of the Baker Hughes weekly US oil rig data.

Figure 7: Baker Hughes Weekly Rig Count – Total US Oil Rigs



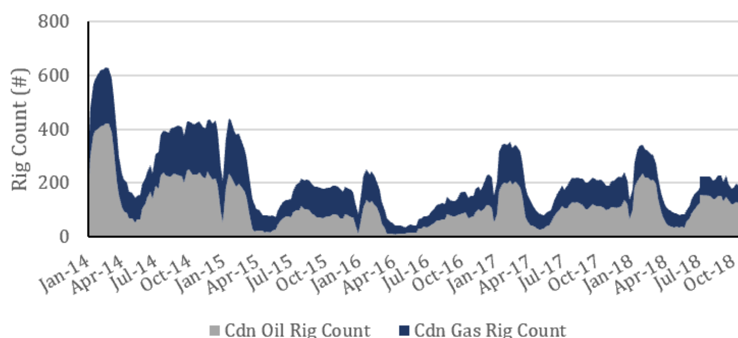
Source: Baker Hughes, SAF

Oil – Total Cdn rigs were down 2 to 196 total rigs

Total Cdn rigs down 2 this week

Total Cdn rigs were down 2 to 196 total rigs as of Nov 9. Cdn oil rigs were down 4 to 117 oil rigs. Gas rigs were +2 to 79 gas rigs. By province, Alberta was down 3 rigs in total and BC was up 1 rig in total. Below is our graph of the Baker Hughes weekly Cdn oil and gas rig data.

Figure 8: Baker Hughes Weekly Rig Count, Total Canadian Rigs



Source: Baker Hughes, SAF

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Oil – EIA increase weekly by 0.4 mmb/d to new US oil record 11.6 mmb/d

US oil up to record 11.6 mmb/d

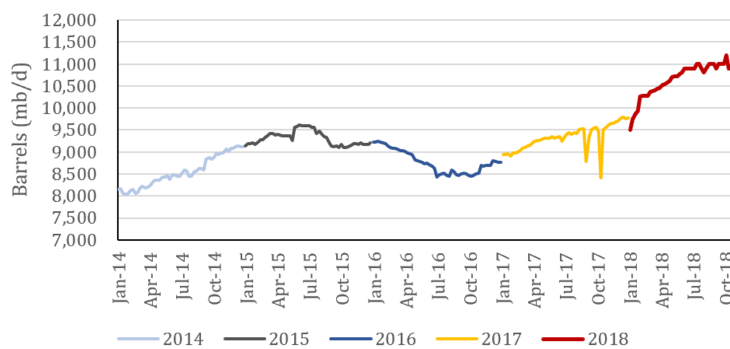
As expected, the EIA increased its weekly estimates of US oil production, and rported that it was up 0.4 mmb/d to 11.6 mmb/d for the Nov 3 week. Last week's (Nov 4, 2018) Energy Tidbits memo noted how the US had reached a new record of 11.2 mmb/d, but that had to be underestimated. This week's increase (and our comment last week) was because of the Form 914 that came out two weeks ago and showed that Aug actuals were ~0.4 mmb/d higher than the weekly estimates. We saw earlier this week that the EIA increased their US oil production forecasti the monthly Short Term Energy Outlook. Lower 48 is estimated up 0.4 mmb/d to 11.1 mmb/d (up from 10.7 mm b/d. Below we pasted an excerpt from the EIA weekly oil production data. [LINK].

Figure 9: Weekly Oil Production

Year-Month	Week 1		Week 2		Week 3		Week 4		Week 5	
	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
2016-Jul	07/01	8,428	07/08	8,485	07/15	8,494	07/22	8,515	07/29	8,460
2016-Aug	08/05	8,445	08/12	8,597	08/19	8,548	08/26	8,488		
2016-Sep	09/02	8,458	09/09	8,493	09/16	8,512	09/23	8,497	09/30	8,467
2016-Oct	10/07	8,450	10/14	8,464	10/21	8,504	10/28	8,522		
2016-Nov	11/04	8,692	11/11	8,681	11/18	8,690	11/25	8,699		
2016-Dec	12/02	8,697	12/09	8,796	12/16	8,786	12/23	8,766	12/30	8,770
2017-Jan	01/06	8,946	01/13	8,944	01/20	8,961	01/27	8,915		
2017-Feb	02/03	8,978	02/10	8,977	02/17	9,001	02/24	9,032		
2017-Mar	03/03	9,088	03/10	9,109	03/17	9,129	03/24	9,147	03/31	9,199
2017-Apr	04/07	9,235	04/14	9,252	04/21	9,265	04/28	9,293		
2017-May	05/05	9,314	05/12	9,305	05/19	9,320	05/26	9,342		
2017-Jun	06/02	9,318	06/09	9,330	06/16	9,350	06/23	9,250	06/30	9,338
2017-Jul	07/07	9,397	07/14	9,429	07/21	9,410	07/28	9,430		
2017-Aug	08/04	9,423	08/11	9,502	08/18	9,528	08/25	9,530		
2017-Sep	09/01	8,781	09/08	9,353	09/15	9,510	09/22	9,547	09/29	9,561
2017-Oct	10/06	9,480	10/13	8,406	10/20	9,507	10/27	9,553		
2017-Nov	11/03	9,620	11/10	9,645	11/17	9,658	11/24	9,682		
2017-Dec	12/01	9,707	12/08	9,780	12/15	9,789	12/22	9,754	12/29	9,782
2018-Jan	01/05	9,492	01/12	9,750	01/19	9,878	01/26	9,919		
2018-Feb	02/02	10,251	02/09	10,271	02/16	10,270	02/23	10,283		
2018-Mar	03/02	10,369	03/09	10,381	03/16	10,407	03/23	10,433	03/30	10,460
2018-Apr	04/06	10,525	04/13	10,540	04/20	10,586	04/27	10,619		
2018-May	05/04	10,703	05/11	10,723	05/18	10,725	05/25	10,769		
2018-Jun	06/01	10,800	06/08	10,900	06/15	10,900	06/22	10,900	06/29	10,900
2018-Jul	07/06	10,900	07/13	11,000	07/20	11,000	07/27	10,900		
2018-Aug	08/03	10,800	08/10	10,900	08/17	11,000	08/24	11,000	08/31	11,000
2018-Sep	09/07	10,900	09/14	11,000	09/21	11,100	09/28	11,100		
2018-Oct	10/05	11,200	10/12	10,900	10/19	10,900	10/26	11,200		
2018-Nov	11/02	11,600								

Source: EIA

Figure 10: US Weekly Oil Production



Source: EIA, SAF

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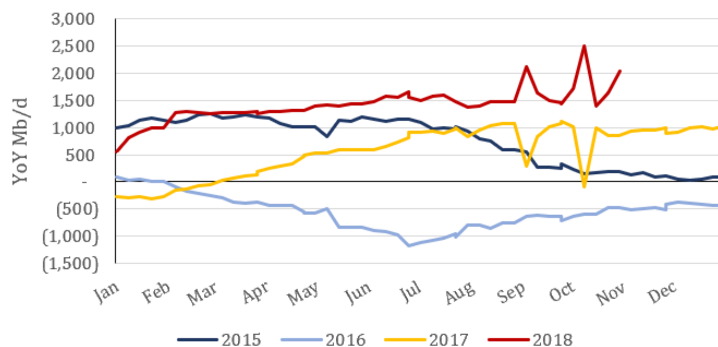
Figure 11: YoY Change In US Weekly Oil Production



Source: EIA, SAF

EIA increases its US oil supply forecasts

Oil –Major negative to oil, big increases to EIA"s 2018/2019 oil production forecasts

One of the major negatives to oil this week (and it shouldn't have surprised anyone) was the EIA making a big increase to its US oil production forecasts for both 2018 and 2019, especially in light of the EIA lowering its oil price assumptions. (i) The EIA dropped its WTI oil price assumption by $5/b in 2019. The new Nov STEO assumes $66.79/b in 2018 (Oct was $68.46) and $64.85/b in 2019 (Oct was $69.56). Its almost $5/b less in 2019, yet the EIA increased its 2019 oil production growth by 300,000 b/d. Normally a $5 lower oil price forecast should have led to a lower oil production forecast. (ii) The increase to 2018 was expected. The new 2018 forecast is 10.90 mmb/d (was 10.74 mmb/d) for 2018, but it revised up its Q3/18 to 11.24 mmb/d (was 11.03 mmb/d) and revised up its Q4/19 to 11.57 mmb/d (was 11.14 mmb/d). The increased oil forecasts was expected. Our Nov 4, 2018 Energy Tidbits warned that the EIA would be increasing their oil production forecast this week following last week's EIA Form 914 that had the "actuals" for Aug at 11.346 mmb/d, which was almost 0.4 mmb/d higher than the weighted average of the EIA's weekly estimates of 10.958 mmb/d. The lower WTI oil price assumption in 2018 didn't have time to impact the fact that Aug was so much higher than expected. The EIA notes this very point "*August 2018 crude oil production was 290,000 b/d higher than expected in the October STEO. This higher level of production raised the baseline for EIA's forecast for 2019 crude oil production*" (iii) The increase to 2019 is bigger than expected in light of a $5/b decrease in WTI oil price assumption. The EIA forecasts 2019 to be 12.06 mmb/d up 300,000 b/d from 11.76 mmb/d in Oct despite the $5 lower oil price assumption. (iv) the YoY increases are 1.55 mmb/d in 2018 vs 2017, and 1.16 mmb/d in 2019 vs 2018. Below is our ongoing table showing the EIA's forecast by forecast month.

Figure 12: EIA Estimated US Crude Oil Production By Forecast Month

(million b/d	2017	Q1/18	Q2/18	Q3/18	Q4/18	2018	Q1/19	Q2/19	Q3/19	Q4/19	2019
Nov 2018	9.35	10.23	10.54	11.24	11.57	10.90	11.83	12.04	12.05	12.31	12.06
Oct 2018	9.35	10.23	10.54	11.03	11.14	10.74	11.41	11.66	11.78	12.16	11.76
Sept 2018	9.35	10.23	10.53	10.80	11.06	10.66	11.31	11.46	11.45	11.78	11.50
Aug 2018	9.37	10.23	10.54	10.77	11.17	10.68	11.50	11.69	11.68	11.94	11.70
July 2018	9.35	10.24	10.71	10.91	11.29	10.79	11.61	11.78	11.76	12.02	11.80
June 2018	9.35	10.24	10.72	10.88	11.31	10.79	11.64	11.75	11.67	11.97	11.76
May 2018	9.35	10.23	10.62	10.78	11.26	10.72	11.70	11.91	11.81	12.00	11.86
Apr 2018	9.32	10.15	10.55	10.78	11.27	10.69	11.46	11.46	11.33	11.52	11.44
Mar 208	9.32	10.25	10.58	10.79	11.17	10.70	11.30	11.30	11.14	11.34	11.27
Feb 2018	9.33	10.24	10.42	10.66	11.04	10.59	11.19	11.21	11.07	11.27	11.18
Jan 2018	9.30	10.04	10.24	10.30	10.51	10.27	10.71	10.83	10.80	11.04	10.85

Source: EIA

CLB's next industry EOR study is Permian

Oil – Core Labs follows its Eagle Ford EOR project with the new Permian EOR project

One of the below the radar themes that we think is at play or at least developing – getting more from shale than expected, or at least not declining as hard or as bad as expected. The attention tends to be on the increased drilling efficiency leading to bigger wells at lower cost. In the

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recent Core Labs Q3 call, they highlighted their work with industry on getting better wells while "*reducing the time and cost for well completion and stimulation program owing to the overall lower stage count.*" But Core Labs also highlighted their work on enhanced oil recovery. EOR is a very important item to determine the ultimate recovery and long term decline rates of shale. Think of EOR no different than a basic waterflood in terms of what it does to increase recovery and smooth out long term decline rates. Core Labs also highlighted their 2nd EOR project with industry, which follows the Eagle Ford EOR project that we have noted the successes therein. In the Q3 call, CLB said "*During the third quarter of 2018, Core Lab received sufficient client support to initiate its second enhanced oil recovery joint industry project, aimed at evaluating engineered gas injection opportunities in unconventional shale reservoirs. This new joint industry project will focus on the Permian age Wolfcamp formation in the Delaware and Midland Basin of West Texas. Like Core's first unconventional EOR joint venture project announced in the second quarter of 2017 for the Eagle Ford formation, the Permian study will be customized to address the unique challenges associated with Permian-based geology and hydrocarbon properties.*" This really follows one of the four themes from our June 30, 2017 blog "*New" Technology Is Working And/Or Increasing In Application To Increase Oil Recovery From Shale/Tight Oil*", when we wrote "*But we wanted to highlight three technology developments that aren't just bigger and tighter fracks, but are items pointing to why US shale/tight oil could continue to surprise to the upside in 2018 - finer proppants, scientifically engineered gas, and tank/cube development."*

Oil – Did Trump signal Iran waivers will continue if needed to keep oil prices down?

Did Trump signal waivers could be extended?

Please note it looks like something material was overlooked in the Trump post midterms press conference. The reports are all picked up that he gave temporary waivers as he didn't want $100 oil, rather he wanted lower oil prices. But what was missed is the second part of his comments on Iran that seem to point to the potential the temporary waivers being longer term (ie being extended) as his priority is keeping oil prices low and not punishing Iran as hard as possible. If Trump was accurate in saying what he meant, his comments are clear that low oil prices are the priority. We know we have to be careful about taking Trump at what he says because he isn't the clearest speaker. However, if we do take him at his word, the lifting of the temporary lifting of some of the sanctions may not get done if oil prices go up too high ie. keeping oil prices low is a bigger focus than hitting Iran as hard as possible. It sounds like this is his priority - keep oil prices low. The White House transcript [LINK] of the Trump press conference noted Trump's comments "*So let me just say about the oil, okay? So we're — we imposed, just recently, the strongest sanctions in the history of our country, just about. Although I guess North Korea is there, too. But I gave some countries a break on the oil. I did it a little bit because they really asked for some help. But I really did it because I don't want to drive oil prices up to $100 a barrel or $150 a barrel, because I'm driving them down. If you look at oil prices, they've come down very substantially over the last couple of months. That's because of me. Because you have a monopoly called "OPEC." And I don't like — wait"*, and "*THE PRESIDENT: And I don't like that monopoly. I don't like it. And oil prices are coming down. So rather than deciding to be as tough as I am on most of the sanctions, what I've done is I said, "We're not going to do it that way; we're going to let some of the oil go out to these countries that really do need it because I don't want to drive the oil prices up to $100 or $150 a barrel, which could happen very easily. It's a very fragile market. Very, very fragile. I know it very well. And it's the absolute right decision. And they'll get tougher as time goes by, <u>maybe, but I don't want to have any effect on the oil prices worldwide, where I drive them up. Because I consider that to be a tax, and I don't like taxes.</u>"* On one hand, now that the midterms are over, you would think it would give him some time to hammer Iran hard as possible. However, with the increasing concerns on trade wars, his priority may be to make sure no hiccups in the US economy that could ruin his messaging in his 2020 run. Notwithstanding his comments of the big midterms success, there was substantial criticism on Trump's decision to prioritize the message on the migrant invasion and not the strength of the US economy. If so and if he plans to run in 2020, then we can see him wanting to make sure no hiccups in the US economy in 2019 that could ruin momentum and his track

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record for a 2020 run. As one of my SAF partners said, the one thing he can't have for 2020 is a recession.

Oil – OPEC JMMC meeting today reportedly discussing a 1 mmb/d cut

OPEC JMMC reportedly discussion a 1 mmb/d cut

We had a news cutoff at 7am mountain this morning and so no official word yet from the OPEC joint ministerial monitoring meeting in UAE today. But all reports are noting that the group is discussing a Saudi proposal for cuts of up to 1 mmb/d. We have seen multiple stories noting comments from other JMMC members like Oman and Venezuela on this idea and we have to believe these lesser players wouldn't be messaging this unless it was wanted by Saudi Arabia. Following the last JMMC Oct 25 meeting, OPEC announced [LINK] "*The JMMC directed the JTC to continue to monitor oil fundamentals and market conditions as well as conformity levels in its efforts to maintain market balance. It further directed the JTC to continue to study the 2019 outlook and present options on 2019 production levels to prevent reemergence of a market imbalance.*"

Oil – Trump reportedly refuses to allow anything to undermine KSA's stability

Trump says KSA is cornerstone of Middle East stability

There looks to be a major Trump foreign policy confirmation coming out of Trump's meeting with Macron on Sat – a clear commitment to support Saudi Arabia and, most significantly, his reportedly saying he refuses to allow anything to undermine the Kingdom's stability. This points to a continuation of Saudi Arabia's increasing military and/or economic fights and/or isolation against the Houthis, Qatar, Iran, etc. Saudi Arabia media all ran a story this weekend on Trump's meeting with Macron yesterday similar to the Arab News story "*Trump assures Macron that Saudi Arabia is the cornerstone of stability in the Middle East*" [LINK] that also said "*Trump also said that he refuses to allow anything to undermine the Kingdom's stability, and emphasized Saudi Arabia's importance as a partner of the United States*." As of our news search cutoff of 7am mountain, we didn't see many western media focused on this statement, but CNN did include in its running live coverage of WWI centenary armistice in France. [LINK] CNN wrote "*However, neither leader wants to do anything that could destabilize Saudi Arabia, the spokesman said at a briefing following the leaders' bilateral talks Saturday in Paris. Khashoggi, a Saudi citizen and Washington Post columnist, was killed in the Saudi consulate in Istanbul on October 2. Both leaders agreed "something very serious happened -- that this assassination was serious and unacceptable," the French presidential spokesman said. However, he added, the United States considers Saudi Arabia to be the "cornerstone of everything in the Middle East" and Washington won't want to destabilize things*"

Saudi coalition big push to get Houthis from Hodeidah looks to be working

Trump's comments on his support for Saudi Arabia is timely with the wide range of stories this week (and not just from Saudi media) on the big military push from the Saudi coalition to capture the strategic port city of Hodeidah from the Houthis. As of our cutoff this morning, the reports are saying that the Saudi coalition has helped regain control over part of Hodeidah. It seems inevitable for the push on Hodeidah to be successful, which would be a major blow to the Houthis considering the importance of the port.

Oil – US "NET" crude oil imports were +275,000 b/d this week

US NET oil imports +275,000 b/d

US NET oil imports were up 275, 000 b/d to 5.134 mmb/d for the Nov 2 week vs 4.859 mmb/d for the Oct 26 week. Oil imports were up 195,000 b/d to 7.539 mmb/d (was 7.344 mmb/d) and oil exports were down 80,000 b/d to 2.405 mmb/d (was 2.485 mmb/d). Oil imports from OPEC were up 159,000 b/d to 2.559 mmb/d. Increased oil imports were from were from Venezuela (+227,000 b/d), Ecuador (+66,000 b/d), and Saudi Arabia (+44,000 b/d). Decreased oil imports this week were from Iraq (-97,000 b/d) and Nigeria (-81,000 b/d). Below is the table we created from EIA's estimate of weekly US oil imports from the top 10 countries. [LINK]

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Figure 13: US Weekly Preliminary Oil Imports By Major Countries

	Aug 31/18	Sept 7/18	Sept 14/18	Sept 21/18	Sept 28/18	Oct 5/18	Oct 12/18	Oct 19/18	Oct 26/18	Nov 2/18
Canada	3,507	3,131	3,498	3,285	3,110	3,274	3,424	3,162	3,190	3,507
Saudi Arabia	1,036	994	1,169	826	997	881	995	1,102	1,029	1,073
Venezuela	643	541	571	424	713	556	630	426	479	706
Mexico	751	614	777	778	901	692	633	908	512	494
Colombia	434	278	71	356	369	236	51	226	150	340
Iraq	154	490	640	347	385	241	211	388	565	468
Ecuador	96	211	95	197	73	138	105	119	95	161
Nigeria	0	174	61	90	57	32	259	212	232	151
Kuwait	0	0	0	0	0	140	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0
Top 10	6,621	6,433	6,882	6,303	6,605	6,190	6,308	6,543	6,252	6,900
Others	1,093	1,158	1,142	1,499	1,360	1,207	1,307	1,135	1,092	639
Total US	7,714	7,591	8,024	7,802	7,965	7,397	7,615	7,678	7,344	7,539

Source: EIA, SAF

Oil – Venezuela's South dock at San Jose export terminal is still down

PDVSA's south dock terminal is still down

With all the noise in Venezuela, its hard to tell how items impact exports, but it seems like Venezuela is being able to mostly maintain its exports, at least to the US, despite the longer than expected time for repairs at the south dock in its major San Jose export terminal. The South Dock has been closed since the end of Aug and its reopening keeps getting delayed. The latest update this week now has the south dock closed until at least Nov 15. The original timeline for the repairs was end of sept, but it has continued to get pushed back later. We note this because the original expectations were that the south dock closure could impact Venezuela exports by 1/3. Our Sept 2, 2018 Energy Tidbits reported how a tanker collision damaged the South loading dock (the main dock) but did not damage the East or West loading docks. At that time, we noted an Argus Media story [LINK] that the South Dock closure could reduce oil exports "*Venezuela´s crude exports could drop by a third in September because of a tanker collision at state-owned PdV´s main terminal, possibly leading to a force majeure declaration, PdV officials tells Argus*", and "*Jose was loading about 950,000 b/d or roughly two thirds of the terminal's 1.5mn b/d design capacity immediately prior to the collision*".

Reminder, Venezuela's refinery problems means they have to send oil for export

The increasing Venezuela oil exports to the US seems at odds with their declining oil production. Last week's (Nov 4, 2018) Energy Tidbits memo noted a good reminder from PBF Energy in its Q3 call as to why Venezuela has been able to keep oil exports at reasonable levels despite declining oil production. PBF noted that Venezuela pushing on oil exports because its refineries are down to operating at 17% ie. they can't refine their oil so try to send it somewhere. In the Q&A, mgmt. replied "*And if you look at Venezuela, their refinery utilization I guess I saw a number last week is down to 17%. So now they're back selling crude to the US and I don't know if we're getting any, I haven't checked it lately, but they're now selling crude and they're selling crude not because their production is up, they're selling crude because they're not consuming it. So they turnaround and they sell the crude and then they have to buy the products in order to get the products consumption to fit demand in the country. I think that what they've got -- what they've got to do*".

Oil – IEA says Venezuela oil production is in "free fall" and soon below 1 mmb/d

IEA: Venezuela oil in "free fall"

Its too bad that Canada's heavy oil doesn't any surplus egress to the Gulf Coast because of the declining Mexico and Venezuela oil production. It didn't get a lot of attention, but Reuters reported [LINK] on comments made by IEA Executive Director Faith Birol on the sidelines of the Africa Oil Week conference in South Africa. Reuters wrote "*Venezuela's crude production was in "free-fall" and could soon fall below 1 million barrels per day (bpd), the International Energy Agency's Executive Director Fatih Birol said on Tuesday …… "Venezuela production is in a free-fall and we expect that soon it may go to even below 1 million barrels per day," he said*." Last week's (Nov 4, 2018) Energy Tidbits memo highlighted the Reuters and Bloomberg surveys for OPEC Oct oil production. Reuters had Venezuela at 1.180 mmb/d in Oct 2018, which is down

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750,000 b/d from 1.930 mmb/d in Oct 2017. Bloomberg had Venezuela at 1.270 mmb/d in Oct 2018, which is down 590,000 b/d from 1.860 mmb/d in Oct 2017.

Oil –Is Mexico oil production going down ~100,000 b/d by year end?

Is Mexico oil going down in Q4?

There was an interesting short Bloomberg terminal brief this week "(*BFW) Pemex Says Reduces 2018 Oil Production Target to 1.82M-1.83M B/D". "(Bloomberg) -- Pemex expects oil production for 2018 to average between 1.82m and 1.83m barrels a day, according to Ulises Hernandez, Pemex director of resources, reserves and partnerships. * Expects 2019 production to also be 1.82m-1.83m b/d. * NOTE: Previous 2018 target was 1.95m b/d".* (i) The lower 2018 of 1.82 to 1.83 mb/d should not surprise anyone given the monthly Pemex reported oil volumes. Our Oct 28, 2018 Energy Tidbits Pemex's reporting that Sept oil was 1.825 mmb/d, and showed the monthly production table below [LINK]. Mexico oil production has been hanging in there for the past year over 1.8 mmb/d. (ii) But the 2018 target infers Mexico oil production will be down another 100,000 b/d in Q4. Pemex's recent Q3 results [LINK] noted YTD Sept 30/18 average oil production of 1.863 mmb/d. We checked Pemex Spanish and English websites this weekend and could not find any comments on this revised guidance. In fact, Pemex posted its new Nov corporate presentation this week and the only oil production forecast information in both the Spanish and English versions is their including their now 2 year old business plan forecast that had the below table. But assuming the 1.82 to 1.83 mm guidance for 2018 is correct, it infers Q4/18 average production of 1.67 to 1.71 mmb/d!. (iii) A return to growth, albeit modest, in 2019 looks reasonable. On the surface, the Bloomberg article suggests flat oil production in 2019 vs 2018, but these are average for the year. As noted above, the 1.82 to 1.83 mmb/d for 2018 infers Q4 is down to 1.67 to 1.71 mmb/d. Our Oct 14, 2018 Energy Tidbits had an item "*Mexico oil decline should stop in 2019*" highlighted the Pemex Spanish release on its oil fields in the shallow waters that should add 210,000 /d and 0.35 bcf/d of new production. We noted the Pemex Spanish release provided details on a per oil field volumes and timing and how the per field timing should add at least ~93,000 b/d (of the 210,000 b/d) in 2019 from two oil field developments . This would support Mexico oil production bouncing off a bottom in Q4/18 or Q1/19. Our Supplemental Documents package includes a GoogleTranslate version of the Pemex Spanish release in Oct on the timing of the new oil field production additions. [LINK]

Figure 14: Mexico Crude Oil Production (thousand b/d)

Oil Production (thousand b/d	2015	2016	16/15	2017	17/16	2018	18/17
Jan	2,251	2,259	0.4%	2,020	-10.6%	1,929	-4.5%
Feb	2,332	2,214	-5.1%	2,016	-8.9%	1,895	-6.0%
Mar	2,319	2,217	-4.4%	2,018	-9.0%	1,864	-7.6%
Apr	2,201	2,177	-1.1%	2,012	-7.6%	1,886	-6.3%
May	2,227	2,174	-2.4%	2,020	-7.1%	1,867	-7.6%
June	2,247	2,178	-3.1%	2,008	-7.8%	1,846	-8.1%
July	2,272	2,157	-5.1%	1,986	-7.9%	1,840	-7.4%
Aug	2,255	2,144	-4.9%	1,930	-10.0%	1,816	-5.9%
Sept	2,271	2,113	-7.0%	1,730	-18.1%	1,825	5.5%
Oct	2,279	2,103	-7.7%	1,902	-9.6%		
Nov	2,277	2,072	-9.0%	1,867	-9.9%		
Dec	2,275	2,035	-10.5%	1,873	-8.0%		

Source: Pemex

Oil – WCS is hit from higher than expected late Oct/Nov Fort Hills and Kearl production

Fort Hills and Kearl producing above expectations

It may well be that "THE" major theme for oil and natural gas markets for the next decade is how a wide range of technology advancements/applications is leading to supply (rate and reserves) surprising to the upside. It isn't just for shale oil, its for all oil and natural gas, including oil sands/bitumen. The Q3 reporting for Suncor and Imperial Oil (also the IMO analyst day this week) highlighted the better production performance, which is likely a key reason for the extra pressure on WCS. The last thing WCS pricing needs is more supply than expected. (i) In mid to late Oct, Suncor and Imperial likely exceeded expectations, sat time, by over 100,000 b/d. (ii) Fort Hills ramp up is faster than guidance. Suncor reported last week

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and highlighted "*The ramp-up at Fort Hills has exceeded our expectations and is currently producing in excess of 90% of its nameplate capacity*." Nameplate is 194,000 b/d gross (Suncor share 105,000 b/d). Suncor Q3 release said "*statements about Fort Hills, including the expectation that Fort Hills will produce at approximately 90% utilization during the fourth quarter of 2018*". Suncor Q3 call slide deck included the below slide showing actual Fort Hills vs guidance and also the "*new guidance*". We believe the graph suggests Fort Hills likely produced ~20,000 b/d (gross) more than expected in Q3 and likely on track for a similar outperformance in Q4/18. (iii) Imperial's Kearl hit 340,000 b/d in late Oct vs annual average plan of 220,000 b/d. IMO had its analyst day on Wed and reported last Friday. Kearl's excellent production in Oct is a key reason why WCS has been so negative in Oct/Nov. In the Q3 call, mgmt. said "*The quarter will have a bit more of the maintenance impact just because of the 1/3, 2/3 split between the third quarter and the fourth quarter of the work that we have completed. We have completed it. We have a rebounded and came out from it. <u>And I'm proud to say that yesterday was our best day ever at Kearl at some 340,000 barrels a day</u>. For the month, because of the maintenance work, we averaged around 200,000 barrels a day for the month of October. The year-to-date stays at essentially at 202,000. And with any really material planned maintenance behind us now, we expect to be at higher rates throughout the rest of the year.*" Analysts tried to press on what the new level should be in light of this 340,000 b/d. in the Q3 call, mgmt. teased to wait until the Nov 7 analyst day. Mgmt said "*And so again, I don't really have numbers. We will talk more about this kind of what do we see beyond the 240,000 next week during our Investor Day. And make no mistake about it, we see numbers beyond the 240,000".* As of our cutoff this morning, unfortunately no transcript has yet been posted on Bloomberg terminal for the analyst day. But the analyst slide deck includes "*Investing to increase production from 200 to 240 kbd in 2020"* and then the next slide "*Opportunities for ~280 kbd, Series of targeted debottlenecking and redundancy improvements".* This sounds extremely conservative in light of the mgmt. statement that they hit 340,000 b/d at the end of Oct. Our Supplemental Documents package includes excerpts from the Suncor Q3 call slide deck and the Imperial analyst day slide deck.

Oil – Keystone XL gets another setback that will delay construction

Another setback for Keystone XL

It seems like Keystone XL can't catch a break. The other big negative this week to WCS was the Montana judge ruling [LINK] on Thursday that concluded "*Plaintiffs' request for injunctive relief is GRANTED. The Court enjoins Federal Defendants and TransCanada from engaging in any activity in furtherance of the construction or operation of Keystone and associated facilities until the Department has completed a supplement to the 2014 SEIS that complies with the requirements of NEPA and the APA*." The National Post had a good story recapping the ruling "*Fresh legal setback for Keystone XL could result in delays of up to a year*" that noted a TransCanada email response (there is no news release as of Sat night 10pm mountain) saying "*Morris' ruling said the U.S. State Department's analysis "fell short of a 'hard look'" at potential spills, likely impact on Native American cultural resources, cumulative emissions from Keystone XL and other oilsands pipelines and how a change in oil prices would affect the viability of the pipeline…… "We have received the judge's ruling and continue to review it. We remain committed to building this important energy infrastructure project," the company said in an emailed statement*". We read the judgement, one item that jumped out was the cumulative emissions analysis. The judgement said "*Defendants failed to analyze cumulative climate impacts along with the pending Alberta Clipper expansion. The Court considers the Department's analysis of Keystone in the Alberta Clipper EIS as a cumulative action. See 40 C.F.R. § 1508.7. The Department similarly should have analyzed the Alberta Clipper pipeline's emissions in the Keystone SEIS. The Department argues that the Keystone SEIS obtained a full picture of the pipeline's climate change impacts. (Doc. 173 at 43.) The Department also admits, however, that the 2014 SEIS failed to analyze greenhouse gas emissions associated with the Alberta Clipper. (Doc. 173 at 50-51.) The Department thus failed to paint a full picture of emissions for these connected actions, and, therefore, ignored its duty to take a "hard look." See Norton, 276 F.3d at 1072."* We need to hear from TransCanada as to how much of a delay, but its hard to see this being resolved in a matter of weeks. The National Post story that it could add a year doesn't

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seem unreasonable. Our Supplemental Documents package includes the National Post story. [LINK]

Pre this ruling, TransCanada was looking at Keystone Xl startup in 2021

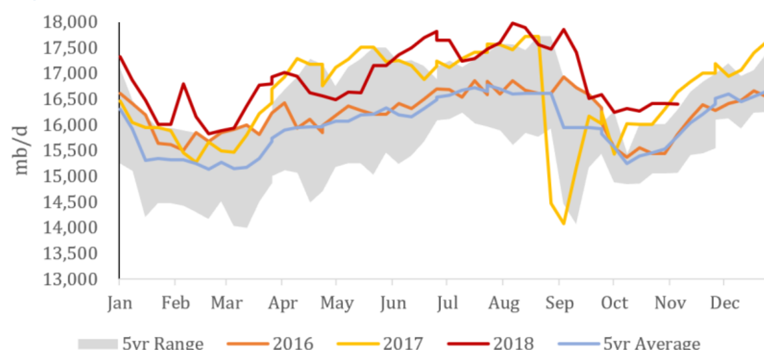
Prior to the judge's ruling, TransCanada gave a detailed answer in their Q3 call Q&A on the timeline to bring Keystone XL into service assuming no setbacks. It was for a 2 year construction timing and an in service in 2021. In the Q&A, mgmt. replied "*Linda, it's Paul Miller here. On the first question about the regulatory hurdles and the timing of those hurdles, there's three in place now. The first one is the challenge to the Presidential Permit in the Montana Court. The judge has indicated that he will rule on the items by December 1. So we would anticipate a decision here over the next two months. The other challenge is the challenge to the approved route in Nebraska by the Public Service Commission that is being challenged at the Nebraska Supreme Court. The written submissions are in, they were in last May. The oral argument is being held to-date. At that point, it's in the court's hands and we would anticipate a decision from them in late December or early 2019. The third area of permitting is the permits from the Bureau of Land Management which governs the access to the federal lands and permits from the Army Corps of Engineers. The issuing agencies have indicated that, with the expected issuance of the supplemental environmental impact statement here in early December, that they would issue those permits in early January. So, with that, we continue our construction planning and preparation in anticipation of resolution of these legal and regulatory hurdles to prepare us for a start of construction in 2019. But we'll have to reflect on the rulings that do come down from the courts as well as the federal agencies. As far as construction activity, we have planned for a two-year construction. That two-year construction takes into consideration the various windows of construction we have and areas where we don't or are not allowed to construct. The most significant would be in the northern part of the U.S. where there's various windows that are close to us in that January to, let's call it, mid to late Q2 time period. So our planning works around those windows. So, to the extent that we are able to proceed to construction in that time period, we would avoid those windows. And to the extent that our resolution of the legal and regulatory hurdles is not in hand until later in that period, we would start construction in those northern tiers in that June time period*."

Oil – Oil input into refineries was mostly unchanged at 16.408 mmb/d

Oil input into refineries was mostly unchanged

The EIA reported its weekly crude oil inputs to refineries for the week of Nov 2 was essentially unchanged. This is a little surprising because the Bloomberg refinery outage reports have been showing declining refinery outages in early Nov. Crude oil input to refineries was 16.408 mmb/d for the Nov 2 week, vs 16.417 mmb/d for the Oct 26 week. Below is our graph of the EIA weekly crude oil input to refineries.

Figure 15: US Refinery Crude Oil Inputs (thousand b/d)



Source: EIA, SAF

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Oil – Excellent crude by rail insights from CN

Crude by rail insights from CN

We had the opportunity (thank you BMO!) to sit in on a small meeting with CN mgmt. in Calgary and heard some excellent insights into rail and crude by rail in particular. The items we have noted are focused on sector insights. (i) Kudos to mgmt. for having a one hour meeting answering any and all questions, but with 4 questioners, we still didn't get a chance to ask all of our questions. (ii) They do not see the risk of Liberals moving to accelerate the phase out of jacketed CPC 1232 tank cars. We asked if they worry that the Liberals move on this pre Oct 2019 election in light of their Sept 19 press release that included the key warning sentence "*The Minister today also announced his support for an industry-led crude oil and condensate tank car working group that will make recommendations to Transport Canada on advancing the timelines for the phase out of jacketed—with a layer of thermal protection—CPC 1232 tank cars.*" They don't see the Liberals taking action pre Oct 2019 election, they don't see Trudeau adding more items that can hurt the economy. (iii) Reminded that moving into the uncertain winter operating conditions period. We did not get a chance to ask how normal winter weather would impact the timing for any big ramp up in crude by rail in Q1. But given the normal uncertainties and challenges with winter conditions, we can't believe they would commit to a big winter ramp up in crude by rail volumes. Then the spring is typically the major maintenance period, which suggests the big ramp up in 2019 crude by rail is after the spring. (ivi) Rough cut of DOT-117J vs other rail cars on their system. We asked if they had a sense of the percentage of DOT-117J tank cars that run on their system and not what their percentage as CN only owns a very small percentage of tank cars that run on its system. We discussed, they didn't have a specific precise number but said that likely similar to the US at roughly 40% DOT-117J vs 60% others. And that over time, the % of DOT-117J will continue to increase. (v) CN crude by rail goes down to Gulf Coast entirely on CN tracks/system. This is a key benefit for CN as it takes the risk out of moving crude by rail on other railways that could have tighter restrictions on tank cars. (vi) Locomotives lead order time. We asked if the big increase in demand for GE locomotives was really extending the time to get a locomotive. Note there are lots of announced orders being put in to GE for locomotives. Its not an issue for CN as they already had their windows lined with options so can't say how others are impacted. We have to believe that there will be timing issues for those late to place their orders. (vii) Thermal coal to Gulf Coast. We noted in the recent Energy Tidbits how CN and Scorpio Bunkers noted the increasing thermal coal to the Gulf Coast and then to Europe. We asked if significant and if they have visibility for it to continue. Again, the point here is that it speaks to the higher than expected LNG cost in 2018 and how that has caused some displacement of LNG in Europe in favor of thermal coal. Mgmt said in 2017, they ran 6 to 7 million tons, whereas the run rate is almost double, and there is visibility for this to continue in 2019. This primarily benefits US thermal coal that they pick up in the mid continent and then rail down to New Orleans. (viii) Prince Rupert port capacity is expanding and will continue to expand. It builds on a number of recent articles on DP World's multiyear plan to double the port capacity. (ix) Prince Rupert landed in North America, but 2 days less sailing and cheaper port fees especially as Prince Rupert is in C$. (ix) Increasing rail efficiency continual focus on safety. There were a number of good comments on their technology push (ie. autonomous rail inspections) that can both improve efficiency and add to their safety focus. Our Supplemental Documents package includes some of their slides from their Nov slide deck.

Oil – Is Notley's crude by rail suggestion planning ahead for Trans Mountain?

Is Notley looking ahead to Trans Mountain delays?

Our Oct 28, 2018 Energy Tidbits noted the reports [LINK] of Alberta Premier Notley's suggestion that the Liberals should invest in locomotives sufficient to haul an extra 1 or 2 unit trains per day. We typically use 700 bbls of light oil per tank car vs 575 barrels of heavy oil per tank car. So just using 600 barrels per car, each unit train (100 cars) would be 60,000 barrels. Ie. 2 unit trains would be 120,000 barrels. One question that we didn't get a chance to ask CN was their view on Notley's plan to increase capacity by the Liberals buying locomotives. The point we wanted to link was that a longer time to buy locomotives plus a longer time to buy new tank cars (see FreightCar Q3 call comments later in this memo) really means that any Notley plan couldn't kick in for at least a year or two due to lead times for equipment. Maybe

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we are giving Notley too much credit, but if we were her, we can see proposing this added rail capacity as a way to replace to some portion what happens if Trans Mountain expansion never gets done, and that there will likely be the need for 200,000 b/d or some level of semi permanent crude by rail. Especially knowing that crude by rail is a less important business for CN than their core businesses of grain, coal and intermodal. This need for semi permanent or permanent crude by rail is even more required with the outperformance at Fort Hills and Kearl as noted earlier in the memo.

Oil – Chevron says scrubbers to be primary mechanism to comply with IMO 2020

Chevron sees increasing scrubbers penetration

Chevron had some good views on IMO 2020 and scrubbers in its Q3 call last Friday. (i) We have been highlighting comments on scrubbers as it seems like the hit to HSFO from IMO 2020 may not be as harsh as expected over time. There will still be a big loss of HSFO to low sulphur fuels, but we continue to see companies indicating scrubbers market share willScrubbers penetration will continue to increase. "*We are seeing scrubber uptake increase for ship owners. We are looking to sell what we do produce to them. We're looking at alternative markets that are non-marine, like power generation, asphalt, folks, who have excess upgrading capability. And we're confident that we're prepared for IMO.*" "*<u>But again, over time, we expect scrubber uptake to increase and that will be the primary mechanism of complying with IMO.</u>*" "*So in terms of MO gas, it's a difficult thing to predict, because there's so many factors. I think one thing I would say is that the underlying – we've seen crude move plus or minus $10 in a few weeks the last couple months. Those movements are much bigger movements on gasoline pricing or any product pricing. We're really talking just about differentials. And MO gas can really – you can see it going either way. It could get pulled up if some of the intermediates that are used for MO gas go to make distillates. You could also make arguments that it could weaken a little bit if runs are higher and there's excess MO gas.*" (ii) Interesting comment on what they won't do as the arb closes. "*Well, again on scrubbing penetration, our view if you step back, the most economic way to comply with the IMO regulations is for ship owners to put in scrubbers, right. That's a much more cost-effective mechanism than investing capital. And we're not – or for refineries to invest capital. We're not looking to make any investments that – large-scale investments that are IMO-related. It's because we view it as transient. One thing about our markets is they work. And when arbs open up, they get closed. There's lots of players. There's lots of capital. And there are lots of people who are working to reduce arbs. So our view is that – sorry, I lost the track on that a bit.*"

Oil & natural gas – sector/play/market insights from Q3 calls

Earnings calls provide excellent insights to the sector

We are now in our favorite time each time of each quarter as it is quarterly reporting and this is when we get the best insights into a range of oil and gas themes/trends, sectors and plays. It was a big week of Q3 reporting. The memo does not get into the quarterly results, forecasts or valuation. Rather the purpose of highlighting a company is to note themes/trends and plays that will help shape a reader's investment thesis to the energy sector. In the conference calls, we also tend to find the best insights from the Q&A portion as opposed to the prepared remarks. Plus we tend to get the best oil and gas sector insights from services, pipelines, refineries and utilities and that was the case again this week. Note we had a number of catch up comments on calls from two weeks ago.

Chevron – Permian oil growth well ahead of plan

Chevron held its Q3 call last Friday. (i) Earlier we noted their comments on scrubbers. (ii) Permian oil growth ahead of plan with better fracs, seems like they won't say any higher growth rate until the March analyst day. Chevron noted "*Permian shale and tight production in the third quarter was 338,000 barrels per day, representing an increase of 150,000 barrels per day. Let me say it again, this is up 80% relative to the same quarter last year. As many of you will realize, that's the equivalent of adding a mid-sized Permian pure play E&P company in a matter of months*." "*We are operating off of a new basis of design and we're finding that that has been incredibly successful. We're pursuing high density fracs and we're finding that that has been successful as well*".

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Confusing as to will they have faster than plan growth rates. in the Q&A, their first response almost sounded like they would sit and not really drive ahead "*And our approach right now would be to take a bit of a pause and to really focus on capturing all the efficiencies that we can that a 20 rig fleet would necessitate basically*", but later they said "*So we think that there's upside potential here as we continue to fine-tune our well placement; fine-tune really the entire I guess I would say value chain associated with the Permian. So, I think we're constructive on the Permian. And we'll certainly give you an update at our March in 2019 SAM, which we've done for several years now running. But I think it's a positive outlook that we feel for that asset*." (iii) Poised to produce more higher end products with IMO 2020. "*Although there are a lot of unknowns and uncertainties with how markets will react, most agree that complex refiners should benefit, as demand increases for marine gas oil. Slide 14 shows that Chevron's refining network has the highest complexity and the highest percentage of conversion capacity among its peer group. It is a result of high-grading our refinery portfolio over the years and investing in upgrading capability. Forward markets expect mid-distillate margins to increase post-IMO and high sulfur fuel oil and sour crude discounts to widen. Chevron's refining network produces over 40% mid-distillates and about 5% fuel oil. And as a complex refiner, we run a high proportion of heavy sour crudes. We believe we're well positioned to benefit from IMO impacts*". (iv)Sounds like they want another Gulf Coast refinery. In the Q&A, mgmt. replied '*Thanks, Jason. Look, I won't comment on media reports or speculation but what I can say is I have for almost as long as I've been on the job now, over two years, talked about the strategic rationale of a Gulf Coast refinery, for three primary reasons. One, we're the only major company that operates one refinery in the Gulf Coast. Second is, we have a strong retail presence in Texas that we supply with third party barrels. And third is the possible integration and synergies with our advantaged position that Pat just talked about in the Permian. At the same time, I've also said we don't need to do anything*". (v) Increasing govt take. Again, we think this is going to be in all parts of the world with oil in the $70 range, and likely also with the strength of LNG prices off the bottom. Chevron was asked about risk of increasing govt take on its Thailand PSC. Mgmt said can't comment while commercial discussion are underway, but did admit it would cost more "*I can confirm that the bidding package does contain tougher fiscal terms. So I think you can build that into your expectations. But exactly what the degree will be, I'm not at liberty to say at this point*". Our Supplemental Documents includes excerpts from the Chevron Q3 call transcript and Q3 call slide deck.

Core Labs – "*The decline curve always wins and never sleeps'*

Core Labs held its Q3 call on Oct 25. (i) Earlier in the memo, we noted Core Labs work with industry to maximize recovery from shale from a couple angles – increasing early recovery at lower cost and maximizing long term recovery/lowering long term decline rates with EOR. (ii) Bullish on oil because of declines and need for investment in oil. The only caveat is some of their countries aren't in decline anymore ie. Angola and Libya. "*Increases in global demand, increases in net decline curve rate and decreases in global inventories have been occurring since July of 2016 coupled with steeply falling production in Mexico, Venezuela, Colombia, Angola, Libya, Iran and China has tightened the global market to the port were longer dated barrels on the curve have increased price and ensure greater international and deepwater investment for the future. Remember the decline curve always wins and never sleeps*." (iii) Expect international Q4 activity improvement to remain low. "*Oil company recognition of the need for investment is evident by the 25 to 30, final investment decisions estimated to be announced in 2018 with approximately 25 announced year-to-date. The company believes fourth quarter 2018 international exploration and production activity levels will be flat with most international development spending continuing to be funded largely from operating budget. We expect fourth quarter international activity improvement to remain low with this lower-than-expected*

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increases in the international rig count." (iv) Expect US rig count to be up slightly in Q4, but completions to decline and DUCs to increase. In the Q&A, mgmt. said "*And so we anticipate that the completion activity, if it's flat now, we think that that continues to go – we think that goes down from here until the capacity comes online. And we think the capacity items doesn't unfold until the back half of 2019 from the takeaway standpoint*." (v) Cdn activity isn't picking up as much as in the US. In the Q&A, mgmt. was asked "*what are you seeing in the Canadian market in terms of activity on your side?*" We were surprised that CLB didn't link in the weak Cdn oil and gas prices as a reason for the less than robust activity in Canada. But CLB mgmt. replied "*Yes, I think the Canadian market we're pretty encouraged there by the request for technologies both on the Production Enhancement and on the Reservoir Description side. The Montney and Duvernay formations are pretty complicated. Your -- someplace you're in condensate areas, some places you're in a natural gas-producing area, some places you're in an oil-producing area, volatile oil. And so clients are having to address the complexities that come with that phase behavior and being on the edges of different phase behavior in those areas. So, I think overall I would say the Canadian market is far from being the robust area that it was before the downturn. But clients gravitate towards technology that answers their questions and so we think we'll do a little bit better than the market up there in general*". Our Supplemental Documents package includes excerpts from the Core Labs Q3 call transcript.

Exxon – Expect to increase Cdn crude by rail by 70,000 b/d in next few months

Exxon held its Q3 call last Friday. (i) Startup of their 1 mmb/d Permian oil pipeline "*will start up in 2021*" and not "by" 2021 as in many models. (ii) Highlighted their integrated model in the Permian/Gulf Coast ie. when oil prices are weak, they capture the profits in the downstream. When oil prices are high, they capture it in the Permian production. (iii) Can run 450,000 b/d of light crude in Gulf Coast refining circuit. "*looking more Downstream, today we have the ability to run 450,000 barrels a day of light crude in our Gulf Coast refining circuit. And this has provided ample incentive to secure efficient transportation capacity to our refineries well in excess of equity production from the Permian. Currently, we have about 270,000 barrels a day of committed capacity. And that's likely going to grow further in the coming quarters. And the 450,000 barrels a day is growing too. In addition to the Beaumont expansion, we're working on some other smaller debottleneck projects to add about another 50,000 barrels to ultimately take our Gulf Coast light crude processing capacity to over 750,000 barrels a day*." (iv) Recapped their key downstream projects. Beaumont. "successfully started up a new hydrofiner at our Beaumont, Texas, facility and a delayed coker at our Antwerp refinery. Beaumont "*hydrofiner will increase production of ultra-low sulfur fuels by 45,000 barrels per day, using a proprietary catalyst that will remove sulfur, while minimizing octane loss*." Antwerp ""*50,000 barrel a day coker is now operational. And the point I want to make here is that it is located at Antwerp, but I want to stress that it's a regional coker. In other words, we're planning to process resids from our entire European circuit at this coke*". (v) Refineries, shifting yield to higher value products "*Downstream earnings growth is this yield shift to grow higher-value products. And that's largely through the deployment of our proprietary catalyst and process technology*." (vi) Expect to increase Cdn crude by rail by 70,000 b/d in next few months. "*During the early days of bringing Kearl on stream, we made the decision to invest in a 210,000 barrel a day capacity rail terminal in Edmonton. And that's to allow efficient unit rail transportation to the Midwest and U.S. Gulf Coast in case Canadian production growth out-ramped pipeline capacity. As you can imagine, the utilization of this terminal is increasing rapidly in this current pipeline constrained environment, which provides another transportation option down to the Midwest and Gulf Coast refineries, in addition to our committed pipeline capacity. Today, we're running about 100,000 barrels a day through this terminal. That should grow to about 170,000 barrels a day by the first quarter of next yea*r". (vii) Angola. Exxon is in the Total operated Angola oil discoveries, which are the

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reasons why Angola oil production has increased in the past couple months. "*In Angola, the first Kaombo FPSO successfully started up in late July, with production expected to reach 115,000 barrels a day. And a second FPSO is planned to start up in mid-2019.*" (viii) LNG, Exxon sees "*growing LNG demand that would certainly allow all those projects to go forward*". PNG will be first, Mozambique second, and then at Golden Pass with Qatar Petroleum. (ix) Increasing govt take. Exxon was asked, but didn't really give any view on increases or not, but stressed its positives as partner. (x) Good recap of Guyana production timeline – Liza 1 in early 2020, Liza 2 in 2022. "So I think that leaves us at this estimate that's out there right now of over 4 billion oil-equivalent barrels, up to 5 FPSOs, peaking at 750,000 barrels a day, with Liza 1 targeting early 2020 and Liza 2 coming in behind that. We're talking to the government right now about our development plan and environmental permit. Hope to start that one up in 2022 or behind that. So we're continuing to tick on along. But when you look at the time between discovery and this projection of the Liza 1 start-up, it's very impressive in terms of what the industry timelines typically look like." Our Supplemental Documents package includes excerpts from the Exxon Q3 call transcript and Q3 call slide deck.

FreightCar America – Tank cars lead time now up to 9 to 12 months

FreightCar America ("RAIL") held its Q3 call last Thurs. (i) RAIL is a railcar manufacturer that makes every type of rail car other than tank cars. They have been going thru a back to basics plan to become more cost competitive. We try to look at as many railcar and railway companies for any insights into tank cars. (ii) Big demand for tank cars means delivery time is "*ballooning*" to up to 9 to 12 months. This came out in one of the questions. "*Ted, we're hearing that lead times on tank cars at the other manufacturers are ballooning to up to 9 to 12 months. Are you guys seeing any evidence of -- as the tank car manufacturers probably get ready to switch over some lines to manufacturer tank cars in 2019, are you seeing any evidence of non-tank car orders coming to you guys, or inquiries escalating? Ted Baun Matt, Ted here. It's a good question. We've heard the same things on the tank cars. We've seen it. As you know, we're not in the tank car market. But with respect to the non-tank cars, there are certain product types that stretch out there as well to those levels, and then there are product types that might only be a quarter or two out. So it's a case-by-case basis. Ideally, it does appear that overall capacity is filling up and that should present opportunities* " (iii) Increasing steel costs are flowing thru to rail car costs. This will impact all tank cars, mgmt. was asked about steel costs and replied "*On a macro level, I know everybody knows this, but the steel environment in North America and even more so in the U.S. is very, very challenging. It's challenging from a overall cost standpoint, from a day-to-day cost variation or fluctuation standpoint, and it's also very challenging from an availability standpoint. And that is going to be with us, quite frankly, probably as long as tariffs are in place, the 332 tariff in particular. And the -- and so we, like our competitors and like every manufacturer in the U.S. that produces with steel and aluminum, it's a tough situation and it's something we're going to have to do the best we can and lift through*".

Nabors – Customer survey points to increasing drilling rig counts in Q4/18

Nabors held its Q3 call last Wed. (i) Customer survey for Lower 48 points to increasing rig levels in Q4. Note this is for drilling rigs and not completion rigs. "*Next, I will share the results of the quarterly survey of our larger Lower 48 customers. We conduct this survey as each quarter ends. We think it is useful to pass along this information which comes directly from customers and represents their views. These operators represent 35% of the Lower 48 land rig count. About 30% of these clients plan to add rigs; 15% plan to drop rigs. From our customer survey, we would expect the industry-wide Lower 48 rig count to add as many as 10 to 15 rigs through the end of the year. A significant portion of the increase is driven by one operator. Last quarter, the survey indicated operators would add 30 to 40 rigs*

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by year end. Since then, the rig count is up approximately 20 rigs." (ii) Strong demand for this super spec rigs and with multi year term. This is reflective of the multi year visibility to Permian. But it is interesting to note, it also includes the Eagle Ford. "*The revenue per day improvement reflects recontracting rigs at higher spot day rates, plus continued increases in term rates. Our most recent 10 super-spec rig contracts were all signed at day rates comfortably above the mid-$20,000 range. Since the last earnings call, we were awarded multi-year work for four super-spec upgrades. These four rigs are destined to work for West Texas and South Texas with deployments through the first quarter of 2019. Together with the three awards I mentioned last quarter, these four make seven total upgrades [ph] of vital (00:08:12), 1,000-horsepower M550s to M750s." " Since last quarter, we have deliberately stretched our contract duration." "At the end of the third quarter, approximately 25% of our Lower 48 fleet was contracted on term beyond one year. We expect the trend toward longer contract durations will continue."* (iii) Early stages of international strength. "*Internationally, we see increased demand in multiple markets including Latin America, the Middle East and the Far East.*" "*International. Globally, we continued to see growing interest from clients for high-spec rigs. During the third quarter, we signed contracts for five additional rigs for work in Russia, Kazakhstan, Colombia, and Argentina*." (iv) See a number of countries with multi year growth and increasing industry activity. In the Q&A, mgmt. was asked if scale mattered for international countries. Mgmt replied "*So, scale does matter. And that's why, Jim, we try to focus on markets that have the potential for scale. If you look at where we're spending most of our time these days, Colombia, Argentina, Saudi, Kuwait, Oman, parts of Russia, Kazakhstan – we think all those markets – places for potential scale."* Our Supplemental Documents package includes excerpts from the Nabors Q3 call transcript

RPC – Slow Q4 for completions with budget exhaustion

RPC is a completions company and held its Q3 call on Oct 24. (i) Slow Q4, extended holiday season likely. No different to the comments seen from other completions companies – slow Q4 and no strong visibility for Q1 In the Q&A, mgmt. replied "*So there are holiday slowdowns, discussions about budget exhaustion and this looming issue which we have not seen yet, but the Permian takeaway capacity issue, all could combine to make fourth quarter low double-digit revenue declines based on what we know now. But again, the big uncertainty is holidays and budgets that we will not know about probably for another four or five weeks*." (ii) Completion bidding for Q4 is pricing down 15% - 20% lower than existing prices. This infers that any producer completing wells in Q4 is likely getting a big price break on Q4/18 completions. This should also hold for Canada. (iii) Completion efficiencies continue to get better for the Permian. Another sign of how the producers are getting their well costs down is the continuing improvement in completion efficiencies. RPC noted this factor in its Q3 call as to how this effects their revenue line ie. more efficient Permian completions means completion costs per well are getting cheaper. Our Supplemental Documents includes excerpts from the RPC Q3 call transcript.

Oil & Natural Gas – Positives and negatives from US midterms

Focus on Michigan and New Mexico post midterms

There are some major uncertainties following the midterms such as how the resultant Democrat controlled House and Republican controlled Senate will deal with future legislation or what the lame duck Republican controlled House and Senate will pass. But there are some specific state level items. (i) Colorado Proposition 112 and Amendment 74 both did not pass. This was good news to the DJ Basin as it meas the big fears of a major hit to drilling didn't emerge. Notwithstanding the failure of 112, we continue believe that there will be pressure for Colorado for some increased regulations or requirements but nowhere near as industry shattering as Proposition 112. Its too early to speculate what increased items will be, but we think the takeaway will be increased costs in one way or another on industry. (ii) Michigan on Line 5. Last week's (Nov 4, 2018) Energy Tidbits highlighted the big lead by Democratic

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Governor candidate and Platts noting [LINK] Whitmer "*has vowed to negotiate the immediate shut down of Enbridge's 540,000 b/d Line 5 pipeline through the Straights of Mackinac, whjile Schuette may leave a deal in place under which the pipeline would continue to operate while a replacement is constructed*". No question, there is going to be some attention on her and her anti Line 5 stance unless she miraculously drops here Line 5 position. It would have attracted huge attention if it was a proposed and not approved project and a proposed but not already successfully operating pipeline. But Enbridge Line 5 is a successfully operating and its Line 5 project is approved. It will attract attention, but its hard to see how she can just get Michigan to back out of either without incurring liability. It doesn't mean she won't try, but the potential liability exposure has to be huge. In addition to the reputational hit. But if she does raise her concerns, we can see it adding perceived risk to Cdn oil egress given the heightened sense of pipeline sensitivity post Trans Mountain. And we think it could cause some delays to the Line 5 project as it would seem like Enbridge will have to do some additional consultation with the new Whitmer administration. A key to Enbridge's success in project management has been that they have done a very good job of consulting with key parties including governments. We have to believe they will take the time to consult with the new administration, its something they know how to do. We suspect the length of any potential delay would depend if any consultation impacted any seasonal limitations to the working in the Strait of Mackinac for the Line 5 project. Fortunately, its an operating pipeline so Cdn oil egress is not interrupted. But ultimately, we think it will likely add some perceived risk to Cdn oil egress and potentially could cause delays to the Line 5 project. But ultimately, the fact that this is a successfully operating pipeline and the Line 5 project was approved by the existing Michigan administration makes it hard to see how Whitmer craters both without incurring some huge potential liability. (iii) New Mexico elects Democrati Governor (Michelle Luján Grisham) for first time since 2002. Lujan Grisham is pro climate change, pro renewable. New Mexico has seen strong oil growth because it is in the Permian. The EIA monthly actuals show New Mexico oil and condensate production has increased from 419,000 b/d in Jan 2017 to 724,000 b/d in Aug 2018. We have trouble believing she will kill the golden goose that is adding to state revenues and will fund programs, but we have to expect she will set up some additional incentives for renewables and likely add costs to the oil sectors by items like methane capture, etc.

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