

# McDaniel & Associates Consultants Ltd.

Table 1

## Summary of Crude Oil and Natural Gas Liquids Price Forecasts July 1, 2019

Year	WTI Crude Oil \$/bbl (1)	Brent Crude Oil \$/bbl (2)	Edmonton Light Crude Oil \$/bbl (3)	Alberta Bow River Hardisty Crude Oil \$/bbl (4)	Western Canadian Select Crude Oil \$/bbl (5)	Alberta Heavy Crude Oil \$/bbl (6)	Sask Cromer Medium Crude Oil \$/bbl (7)	Edmonton Cond. & Natural Gasolines \$/bbl	Edmonton Ethane \$/bbl	Edmonton Propane \$/bbl	Edmonton Butanes \$/bbl	Inflation %	US/CAN Exchange Rate \$/US\$/CAN
<b>History</b>													
1987	19.30		24.30	20.79				23.80		9.98	16.80		0.755
1988	16.00		18.70	14.41				18.30		8.19	12.95		0.812
1989	19.60		22.20	18.09				21.80		8.14	10.35		0.844
1990	24.50		27.60	21.06		16.00		27.00		13.67	16.21		0.857
1991	21.40		23.40	15.07		9.05		22.90		11.91	15.25		0.873
1992	20.55		23.50	17.52		12.95		23.00		10.55	14.05		0.828
1993	18.60		21.90	16.70		13.30		21.50		14.10	13.55		0.775
1994	17.20		22.20	18.43		15.00		21.75		12.50	13.45		0.732
1995	18.45		24.25	20.80		17.25		23.76		13.90	13.80		0.729
1996	22.10		29.35	25.11		20.05		28.75		22.20	17.15		0.733
1997	20.55	19.09	27.80	21.22		14.40		31.10		18.60	19.05		0.722
1998	14.40	12.77	20.35	14.60		9.40	17.00	21.85		10.95	11.90		0.687
1999	19.25	17.86	27.60	23.35		19.65	25.47	27.60		15.45	17.73		0.673
2000	30.31	28.40	44.72	34.35		27.80	40.10	46.25		31.55	35.00		0.674
2001	25.97	24.42	39.60	25.07		18.05	32.22	42.44		29.15	28.45		0.646
2002	26.10	24.95	39.95	31.65		27.60	34.93	40.79		19.85	26.10		0.637
2003	31.05	28.85	43.15	32.68		27.40	37.57	44.19		30.15	33.45		0.716
2004	41.40	38.30	52.54	37.60	36.14	30.40	45.94	54.09		33.28	39.45		0.770
2005	56.56	54.48	68.72	44.83	44.60	34.35	57.47	69.63		43.29	52.58		0.826
2006	66.23	65.20	72.80	51.55	51.22	43.14	61.25	75.06		44.05	60.10		0.880
2007	72.30	72.80	76.35	53.25	52.90	44.63	65.40	77.36	NA	49.45	63.75		0.935
2008	99.60	97.80	102.20	84.30	82.94	75.55	93.20	104.75	NA	58.40	75.25		0.943
2009	61.80	61.60	65.90	60.30	58.58	55.30	62.80	68.15	NA	38.60	49.25		0.880
2010	79.50	79.90	77.50	68.50	67.23	61.45	73.80	84.25	NA	46.70	66.05		0.971
2011	95.10	111.25	95.00	78.55	77.10	67.90	88.90	104.20	NA	55.15	76.50		1.012
2012	94.20	111.65	86.10	74.35	73.08	63.65	82.10	100.80	NA	28.60	69.55		1.000
2013	97.95	108.60	93.05	76.55	75.25	65.25	88.25	104.65	NA	38.90	69.40		0.971
2014	93.00	99.00	93.50	80.40	79.10	71.20	87.80	102.40	NA	45.05	69.60		0.906
2015	48.80	52.35	57.75	46.10	44.80	39.55	51.45	60.30	NA	6.65	35.55		0.780
2016	43.30	43.55	53.85	40.30	39.00	33.35	48.95	56.20	NA	13.15	34.35		0.760
2017	50.90	54.25	62.85	52.00	50.70	45.20	59.85	66.85	NA	28.90	44.60		0.770
2018	64.95	71.05	69.65	51.25	49.95	40.00	70.20	79.20	NA	27.55	32.80		0.770
2019 (6 mos)	57.40	65.50	69.35	61.95	61.00	57.80	68.35	70.85		14.70	15.15		0.750
<b>Forecast</b>													
2019 (6 mos)	58.00	64.00	71.30	59.20	58.50	51.00	68.40	75.30	5.40	14.40	31.30	0.0	0.750
2020	61.20	65.30	72.80	60.40	59.70	52.10	68.80	76.90	7.00	20.50	37.30	2.0	0.775
2021	65.00	68.10	75.00	62.30	61.50	53.60	69.80	79.20	9.00	24.70	41.20	2.0	0.800
2022	69.00	71.10	79.90	66.30	65.50	57.10	74.30	84.10	10.00	31.10	49.80	2.0	0.800
2023	73.10	75.30	84.90	70.50	69.60	60.70	79.00	89.20	10.60	33.10	52.90	2.0	0.800
2024	74.50	76.70	86.50	71.80	70.90	61.80	80.40	90.90	11.00	33.80	53.90	2.0	0.800
2025	76.00	78.30	88.20	73.20	72.30	63.10	82.00	92.70	11.00	34.40	54.90	2.0	0.800
2026	77.50	79.80	90.00	74.70	73.80	64.40	83.70	94.60	11.00	35.00	56.00	2.0	0.800
2027	79.10	81.40	91.80	76.20	75.30	65.60	85.40	96.50	11.40	35.70	57.20	2.0	0.800
2028	80.70	83.10	93.70	77.80	76.80	67.00	87.10	98.50	11.60	36.50	58.30	2.0	0.800
2029	82.30	84.70	95.60	79.30	78.40	68.40	88.90	100.50	12.00	37.30	59.50	2.0	0.800
2030	83.90	86.40	97.40	80.80	79.90	69.60	90.60	102.40	12.20	38.00	60.70	2.0	0.800
2031	85.60	88.10	99.40	82.50	81.50	71.10	92.40	104.50	12.40	38.70	61.90	2.0	0.800
2032	87.30	89.90	101.40	84.20	83.10	72.50	94.30	106.60	12.80	39.60	63.10	2.0	0.800
2033	89.10	91.70	103.50	85.90	84.90	74.00	96.30	108.80	13.00	40.40	64.40	2.0	0.800
Thereafter	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	2.0	0.800

- (1) West Texas Intermediate at Cushing Oklahoma 40 degrees API, 0.5% sulphur
- (2) North Sea Brent Blend 37 degrees API, 1.0% sulphur
- (3) Edmonton Light Sweet 40 degrees API, 0.3% sulphur
- (4) Bow River at Hardisty, Alberta (Heavy stream)
- (5) Western Canadian Select at Hardisty, Alberta
- (6) Heavy crude oil 12 degrees API at Hardisty, Alberta (after deduction of blending costs to reach pipeline quality)
- (7) Midale Cromer crude oil 29 degrees API, 2.0% sulphur

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Table 2

## Summary of Natural Gas Price Forecasts July 1, 2019

Year	U.S. Henry Hub Gas Price \$/MMBtu	Alberta AECO Spot Price \$/MMBtu	Alberta Average Plantgate \$/MMBtu	Alberta Aggregator Plantgate \$/MMBtu	Empress \$/MMBtu	Sask. Prov. Gas Plantgate \$/MMBtu	British Columbia Average Plantgate \$/MMBtu	British Columbia Station 2 \$/MMBtu
(1)								
<b>History</b>								
1987	1.50		1.64	1.82				
1988	1.85		1.44	1.66				
1989	1.68		1.47	1.57				
1990	1.67		1.45	1.64				
1991	1.54		1.18	1.31			1.13	
1992	1.79		1.22	1.30			1.10	
1993	2.13		1.89	1.60			2.13	
1994	1.92		1.83	1.81			1.87	
1995	1.62		1.18	1.23			1.12	
1996	2.50	1.39	1.54	1.63			1.47	
1997	2.59	1.87	1.84	1.86			1.98	
1998	2.06	2.04	1.90	1.88		2.05	2.00	
1999	2.28	2.96	2.60	2.46		2.82	2.77	
2000	4.31	5.02	4.80	4.57		4.78	4.88	
2001	3.98	6.30	5.90	5.25		5.71	6.30	
2002	3.36	4.07	3.89	3.80		3.90	3.93	
2003	5.49	6.66	6.37	6.00		6.40	6.32	
2004	5.90	6.87	6.62	6.35		6.48	6.45	
2005	8.60	8.58	8.43	8.48		8.35	8.12	
2006	6.75	7.16	6.87	6.59		6.67	6.45	
2007	6.95	6.65	6.41	6.35		6.18	6.25	
2008	8.85	8.15	7.90	8.10		8.07	8.10	
2009	3.95	4.20	3.95	3.90		3.87	4.05	
2010	4.40	4.15	3.90	3.85		3.96	3.90	
2011	4.00	3.70	3.50	3.75		3.56	3.30	
2012	2.75	2.45	2.25	2.25		2.31	2.25	
2013	3.75	3.20	3.00	3.00		3.10	2.90	3.08
2014	4.35	4.40	4.20	4.20	4.53	4.40	4.10	4.20
2015	2.60	2.80	2.55	2.55	3.00	2.70	2.00	2.10
2016	2.50	2.10	1.90	1.90	2.31	2.20	1.55	1.68
2017	2.95	2.40	2.15	2.15	2.83	2.35	1.75	1.88
2018	3.05	1.55	1.35	1.35	2.85	1.60	1.20	1.40
2019 (6 mos)	2.70	1.65	1.45	1.45	3.05	2.30	0.80	0.95
<b>Forecast</b>								
2019 (6 mos)	2.55	1.55	1.35	1.35	2.55	1.45	0.95	1.10
2020	2.85	1.95	1.75	1.75	2.65	1.85	1.35	1.50
2021	3.05	2.45	2.25	2.25	2.90	2.35	1.95	2.11
2022	3.20	2.70	2.50	2.50	2.85	2.60	2.30	2.46
2023	3.40	2.85	2.65	2.65	3.00	2.75	2.45	2.61
2024	3.50	2.95	2.75	2.75	3.10	2.85	2.55	2.72
2025	3.55	3.00	2.75	2.75	3.15	2.85	2.50	2.67
2026	3.60	3.00	2.75	2.75	3.15	2.85	2.50	2.67
2027	3.70	3.10	2.85	2.85	3.30	2.95	2.60	2.78
2028	3.75	3.15	2.90	2.90	3.35	3.00	2.65	2.83
2029	3.85	3.25	3.00	3.00	3.45	3.10	2.75	2.93
2030	3.90	3.30	3.05	3.05	3.50	3.15	2.80	2.99
2031	4.00	3.35	3.10	3.10	3.55	3.25	2.85	3.04
2032	4.10	3.45	3.20	3.20	3.65	3.35	2.95	3.14
2033	4.15	3.50	3.25	3.25	3.70	3.40	3.00	3.20
Thereafter	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr

(1) This forecast also applies to direct sales contracts and the Alberta gas reference price used in the Crown royalty calculations.