

McDaniel & Associates Consultants Ltd.
Summary of Crude Oil and Natural Gas Liquids Price Forecasts
April 1, 2017

Year	WTI	Brent	Edmonton	Alberta	Western	Alberta	Sask	Edmonton	Edmonton	Edmonton	Edmonton	Inflation	US/CAN	
	Crude Oil	Crude Oil	Light Crude Oil	Bow River Hardisty Crude Oil	Canadian Select Crude Oil	Heavy Crude Oil	Cromer Medium Crude Oil	Cond. & Natural Gasolines					Ethane	Propane
	\$/bbl	\$/bbl	\$/bbl	\$/bbl	\$/bbl	\$/bbl	\$/bbl	\$/bbl	\$/bbl	\$/bbl	\$/bbl	%	\$/\$/	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)							
History														
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 (3 mos)	51.75	53.70	65.00	51.65	50.40	45.40	60.10		69.65	NA	29.70	44.60	0.760	
Forecast														
2017 (9 mos)	52.50	54.50	66.50	51.90	51.20	44.30	59.90		69.50	11.20	17.70	41.40	0.0	0.750
2018	56.10	57.10	69.40	56.20	55.50	48.20	64.50		72.50	10.60	21.00	45.80	2.0	0.775
2019	59.80	60.80	72.30	60.00	59.30	51.70	67.20		75.40	11.40	24.90	47.70	2.0	0.800
2020	66.30	67.40	77.80	64.60	63.80	55.60	72.40		81.00	12.60	26.90	54.10	2.0	0.825
2021	73.10	74.20	83.40	69.20	68.40	59.60	77.60		86.60	13.80	29.00	61.10	2.0	0.850
2022	77.30	78.40	88.30	73.30	72.40	63.10	82.10		91.60	14.80	30.80	64.70	2.0	0.850
2023	78.80	79.90	90.00	74.70	73.80	64.40	83.70		93.40	15.20	31.40	65.90	2.0	0.850
2024	80.40	81.50	91.80	76.20	75.30	65.60	85.40		95.20	15.40	32.00	67.30	2.0	0.850
2025	82.00	83.20	93.70	77.80	76.80	67.00	87.10		97.20	15.80	32.70	68.60	2.0	0.850
2026	83.70	84.90	95.60	79.30	78.40	68.40	88.90		99.20	16.20	33.40	70.00	2.0	0.850
2027	85.30	86.50	97.40	80.80	79.90	69.60	90.60		101.10	16.40	34.00	71.40	2.0	0.850
2028	87.00	88.20	99.40	82.50	81.50	71.10	92.40		103.10	16.80	34.70	72.80	2.0	0.850
2029	88.80	90.10	101.40	84.20	83.10	72.50	94.30		105.20	17.20	35.40	74.30	2.0	0.850
2030	90.60	91.90	103.50	85.90	84.90	74.00	96.30		107.40	17.60	36.20	75.80	2.0	0.850
2031	92.40	93.70	105.50	87.60	86.50	75.40	98.10		109.50	18.00	36.90	77.30	2.0	0.850
Thereafter	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	+2%/yr	2.0	0.850

(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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Year	U.S. Henry Hub Gas Price \$/MMBtu	Alberta AECO Spot Price \$/MMBtu	Alberta Average Plantgate \$/MMBtu	Alberta Aggregator Plantgate \$/MMBtu	Alberta Spot Sales Plantgate \$/MMBtu	Sask. Prov. Gas Plantgate \$/MMBtu	British Columbia Average Plantgate \$/MMBtu	British Columbia Station 2 \$/MMBtu
(1)								
History								
1987	1.50		1.64	1.82	-			
1988	1.85		1.44	1.66	1.21			
1989	1.68		1.47	1.57	1.28			
1990	1.67		1.45	1.64	1.20			
1991	1.54		1.18	1.31	0.97		1.13	
1992	1.79		1.22	1.30	1.04		1.10	
1993	2.13		1.89	1.60	2.16		2.13	
1994	1.92		1.83	1.81	1.86		1.87	
1995	1.62		1.18	1.23	1.02		1.12	
1996	2.50	1.39	1.54	1.63	1.34		1.47	
1997	2.59	1.87	1.84	1.86	1.67		1.98	
1998	2.06	2.04	1.90	1.88	1.84	2.05	2.00	
1999	2.28	2.96	2.60	2.46	2.78	2.82	2.77	
2000	4.31	5.02	4.80	4.57	4.85	4.78	4.88	
2001	3.98	6.30	5.90	5.25	6.10	5.71	6.30	
2002	3.36	4.07	3.89	3.80	3.90	3.90	3.93	
2003	5.49	6.66	6.37	6.00	6.49	6.40	6.32	
2004	5.90	6.87	6.62	6.35	6.70	6.48	6.45	
2005	8.60	8.58	8.43	8.48	8.42	8.35	8.12	
2006	6.75	7.16	6.87	6.59	6.96	6.67	6.45	
2007	6.95	6.65	6.41	6.35	6.43	6.18	6.25	
2008	8.85	8.15	7.90	8.10	7.90	8.07	8.10	
2009	3.95	4.20	3.95	3.90	3.95	3.87	4.05	
2010	4.40	4.15	3.90	3.85	3.90	3.96	3.90	
2011	4.00	3.70	3.50	3.75	3.50	3.56	3.30	
2012	2.75	2.45	2.25	2.25	2.25	2.31	2.25	
2013	3.75	3.20	3.00	3.00	3.00	3.10	2.90	3.08
2014	4.35	4.40	4.20	4.20	4.20	4.40	4.10	4.20
2015	2.60	2.80	2.55	2.55	2.55	2.70	2.00	2.10
2016	2.50	2.10	1.90	1.90	1.90	2.20	1.55	1.68
2017 (3 mos)	3.00	3.00	2.70	2.70	2.70	3.00	2.30	2.43
Forecast								
2017 (9 mos)	3.25	3.00	2.80	2.80	2.80	2.90	2.50	2.63
2018	3.05	2.85	2.65	2.65	2.65	2.75	2.35	2.48
2019	3.20	3.05	2.85	2.85	2.85	2.95	2.65	2.79
2020	3.45	3.35	3.15	3.15	3.15	3.25	2.95	3.09
2021	3.80	3.65	3.45	3.45	3.45	3.55	3.25	3.39
2022	4.00	3.90	3.70	3.70	3.70	3.80	3.50	3.64
2023	4.10	4.05	3.80	3.80	3.80	3.90	3.55	3.70
2024	4.15	4.10	3.85	3.85	3.85	3.95	3.60	3.75
2025	4.25	4.20	3.95	3.95	3.95	4.05	3.70	3.85
2026	4.35	4.30	4.05	4.05	4.05	4.15	3.80	3.96
2027	4.40	4.35	4.10	4.10	4.10	4.20	3.85	4.01
2028	4.50	4.45	4.20	4.20	4.20	4.30	3.95	4.11
2029	4.60	4.55	4.30	4.30	4.30	4.45	4.05	4.21
2030	4.70	4.65	4.40	4.40	4.40	4.55	4.15	4.32
2031	4.80	4.75	4.50	4.50	4.50	4.65	4.25	4.42
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.