



# **Produced Gas Isotope and Compositional Analyses**

**Crestone Peak Resources Produced Gases  
Colorado**

**Crestone Peak Resources**

May 20, 2019



PRODUCED GAS ISOTOPE ANALYSIS

Crestone Peak Resources Crestone Peak Resources Produced Gases, Colorado

Sample ID	Cylinder ID Number	COGCC ID	Sampling Date	Sampling Time	Shipment	Casing Pressure (psia)	Stable Carbon Isotopes		δ <sup>13</sup> C Propane (‰)	δ <sup>13</sup> C i-Butane (‰)	δ <sup>13</sup> C n-Butane (‰)	δ <sup>13</sup> C i-Pentane (‰)	δ <sup>13</sup> C n-Pentane (‰)	δD Methane (‰)	δ <sup>13</sup> C CO2 (‰)
							δ <sup>13</sup> C Methane (‰)	δ <sup>13</sup> C Ethane (‰)							
Billings 22-18 - Production CSG		431459	2/13/2019	11:00 AM	8th Shipment		-50.2	-38.4	-28.8	-31.1	-28.5			-233	-4.8
Billings 22-18 - Surface CSG		431459	2/13/2019	11:00 AM	8th Shipment		-54.6	-37.1	-32.9	-33.2	-31.2			-251	-13.8
Branch 1 Well - Production CSG		243009	2/12/2019	9:00 AM	8th Shipment		-51.7	-32.4	-29.3	-31.7	-28.8			-247	-7.2
Branch 1 Well - Surface CSG		243009	2/12/2019	9:00 AM	8th Shipment		-51.6	-30.4	-26.4	-30.6	-27.5			-246	-14.8
Coslett 1C-22H - BH		456848	3/4/2019	11:20 AM	8th Shipment		-44.9	-32.8	-27.4					-230	-14.0
Coslett B1X - Production CSG		244835	2/19/2019	12:45 PM	8th Shipment		-49.4	-32.9	-27.8	-31.4	-27.9			-249	1.2
Coslett B1X - Surface CSG		244835	2/19/2019	12:40 PM	8th Shipment		-51.0	-33.7	-29.5	-32.0	-29.4			-244	-18.2
Costigan 34-20 - Production CSG		301573	2/26/2019	10:30 AM	8th Shipment		-47.5	-31.8	-28.6	-31.0	-28.8			-240	0.5
Costigan 34-20 - Surface CSG		301573	2/26/2019	10:30 AM	8th Shipment		-51.7	-35.2	-29.7	-32.4	-29.4			-254	-12.4
Costigan 43-20 - Production CSG		301574	2/26/2019	9:30 AM	8th Shipment		-48.1	-32.9	-28.9	-30.8	-27.6			-247	0.7
Costigan 43-20 - Surface CSG		301574	2/26/2019	9:30 AM	8th Shipment		-49.3	-33.2	-28.4	-31.7	-28.6			-248	-15.0
Costigan 6-8-20 - Production CSG		301900	2/26/2019	9:00 AM	8th Shipment		-47.5	-32.5	-27.0	-31.7	-27.0			-241	-2.0
Costigan 6-8-20 - Surface CSG		301900	2/26/2019	9:00 AM	8th Shipment		-50.0	-34.7	-28.4	-32.5	-28.3			-244	-18.3
Kenyon 34-19 - Production CSG		420930	2/28/2019	9:10 AM	8th Shipment		-49.7	-34.5	-28.3	-32.3	-28.2			-252	-0.3
Kenyon 34-19 - Surface CSG		420930	2/28/2019	9:10 AM	8th Shipment		-57.4	-36.3	-29.5	-32.9	-29.0			-266	-13.2
Kenyon 4-8-19 - Production CSG		420933	2/28/2019	9:00 AM	8th Shipment		-47.5	-32.8	-28.5	-32.7	-28.4			-245	1.0
Kenyon 4-8-19 - Surface CSG		420933	2/28/2019	9:00 AM	8th Shipment		-67.8	-34.5	-28.0	-32.3	-27.9			-281	-14.9
Kenyon 8-4-19 - Production CSG		420935	2/27/2019	3:00 PM	8th Shipment		-49.0	-33.7	-28.6	-32.5	-28.3			-245	1.0
Kenyon 8-4-19 - Surface CSG		420935	2/27/2019	3:00 PM	8th Shipment		-74.9	-38.0	-29.3	-32.5	-29.0			-279	-13.5
Kenyon 8-6-19 - Production CSG		420932	2/27/2019	2:30 PM	8th Shipment		-47.7	-32.6	-28.3	-32.6	-28.1			-246	0.5
Kenyon 8-6-19 - Surface CSG		420932	2/27/2019	2:30 PM	8th Shipment		-65.3	-31.5	-26.8	-31.0	-27.0			-277	-14.2
Kenyon 8-8-19 - Production CSG		420926	2/27/2019	3:30 PM	8th Shipment		-48.6	-32.8	-28.6	-32.4	-28.6			-247	1.1
Kenyon 8-8-19 - Surface CSG		420926	2/27/2019	3:30 PM	8th Shipment		-65.5	-32.2	-28.5	-30.3	-27.8			-277	-14.3
McPeck 14-10 - Production CSG		422444	2/13/2019	3:30 PM	8th Shipment		-48.3	-32.4	-28.4	-31.8	-28.3			-241	2.5
McPeck 14-10 - Surface CSG		422444	2/13/2019	3:30 PM	8th Shipment		-52.8	-32.6	-28.4	-31.9	-28.1			-254	0.4
McPeck 2-8-10 - Production CSG		431851	2/13/2019	3:00 PM	8th Shipment		-50.0	-32.3	-28.7	-32.3	-28.1			-242	2.6
McPeck 2-8-10 - Surface CSG		431851	2/13/2019	3:00 PM	8th Shipment		-50.2	-33.7	-29.3	-32.6	-29.2			-248	-13.2
McPeck 4-8-10 - Surface CSG		431853	2/13/2019	4:00 PM	8th Shipment		-56.6	-35.5	-30.2	-33.6	-29.9			-250	-13.9
Melbon Ranch 4C-17H - Production CSG		457071	2/11/2019	1:30 PM	8th Shipment		-48.8	-33.8	-30.3	-33.6	-29.5			-248	-13.3
Melbon Ranch 4C-17H - Surface CSG		457071	2/11/2019	1:30 PM	8th Shipment		-50.2	-35.1	-30.2	-31.1	-27.6			-243	-3.0
Melbon Ranch 4D-17H - Production CSG		457075	2/11/2019	1:00 PM	8th Shipment		-48.5	-32.5	-30.0	-31.7	-28.2			-265	-14.7
Melbon Ranch 4D-17H - Surface CSG		457075	2/11/2019	1:00 PM	8th Shipment		-49.7	-30.6	-29.0					-243	-3.3
Melbon Ranch 4E-17H - Production CSG		457067	2/11/2019	12:00 PM	8th Shipment		-48.6	-30.2	-29.0	-31.6	-29.0			-251	-16.7
Melbon Ranch 4E-17H - Surface CSG		457067	2/11/2019	12:00 PM	8th Shipment										-16.5
Melbon Ranch 4I-17H - Production CSG		457068	2/11/2019	11:00 AM	8th Shipment		-49.1	-30.5	-28.8	-31.1	-29.1			-250	0.5
Melbon Ranch 4I-17H - Surface CSG		457068	2/11/2019	11:00 AM	8th Shipment		-52.0	-31.8						-256	-16.3
Pratt 0-2-29 - Braden Head		419911	2/28/2019	2:15 PM	8th Shipment		-54.9	-33.2	-28.8	-31.7	-29.1			-241	-11.9
Pratt 0-2-29 - Production CSG		419911	2/28/2019	2:20 PM	8th Shipment		-48.5	-33.4	-28.4	-31.9	-28.6			-243	-10.3
Pratt 12-29 - Braden Head		420037	2/28/2019	2:25 PM	8th Shipment		-54.7	-32.9	-29.5	-32.2	-29.0			-236	-11.3
Pratt 12-29 - Production CSG		420037	2/28/2019	2:30 PM	8th Shipment		-47.4	-31.5	-28.3	-31.3	-27.8			-237	-12.6
Pratt 21-29 - Braden Head		420033	2/28/2019	2:05 PM	8th Shipment		-51.1	-34.9	-31.0	-32.4	-29.2			-245	-12.3
Pratt 21-29 - Production CSG		420033	2/28/2019	2:10 PM	8th Shipment		-46.6	-33.5	-29.3	-31.4	-28.2			-243	-13.2
Pratt 22-29 - Braden Head		420039	2/28/2019	2:45 PM	8th Shipment		-48.9	-33.8	-30.3	-31.8	-29.1			-247	-14.3
Pratt 22-29 - Production CSG		420039	2/28/2019	2:50 PM	8th Shipment		-47.7	-33.6	-29.2	-31.8	-28.7			-244	-11.4
Pratt 2-4-29 - Braden Head		419942	2/28/2019	3:25 PM	8th Shipment		-50.4	-32.5	-29.5	-31.2	-28.6			-246	-12.4
Pratt 2-4-29 - Production CSG		419942	2/28/2019	2:46 PM	8th Shipment		-47.0	-31.5	-28.8	-30.9	-28.3			-243	-13.5
Pratt 4-2-29 - Braden Head		420035	2/28/2019	2:55 PM	8th Shipment		-49.7	-34.3	-31.1	-32.4	-30.2			-247	-14.6
Pratt 4-2-29 - Production CSG		420035	2/28/2019	3:00 PM	8th Shipment		-48.0	-32.1	-29.1	-32.0	-28.9			-244	-10.2
Regnier Farms 31-19 - Production CSG		288768	2/12/2019	1:00 PM	8th Shipment		-51.0	-33.8	-30.4	-32.6	-30.2			-245	-14.0
Regnier Farms 31-19 - Surface CSG		288768	2/12/2019	1:00 PM	8th Shipment		-52.9	-33.3	-30.4	-31.1	-29.9			-238	-4.3
Regnier Farms 32-19 - Production CSG		282677	2/12/2019	2:30 PM	8th Shipment		-50.2	-33.0	-30.2	-32.8	-30.0			-244	-3.6
Regnier Farms 32-19 - Surface CSG		282677	2/12/2019	2:30 PM	8th Shipment		-56.8	-35.5	-32.4	-31.9	-31.8			-228	-14.2
Regnier Farms 42-19 - Production CSG		270352	2/13/2019	8:30 AM	8th Shipment		-48.4	-30.2	-28.0	-30.6	-27.8			-237	-10.3
Regnier Farms 42-19 - Surface CSG		270352	2/13/2019	8:30 AM	8th Shipment		-57.3	-35.8	-31.9	-32.8	-31.4			-255	-13.6
Regnier Farms 43-19 - Production CSG		276476	2/15/2019	9:00 AM	8th Shipment		-49.8	-34.4	-30.0	-31.8	-28.7			-225	-5.1
Regnier Farms 43-19 - Surface CSG		276476	2/15/2019	9:00 AM	8th Shipment		-56.6	-34.6	-31.8	-32.1	-30.4			-207	-13.6
Regnier Farms B Unit 1 - Surface CSG		243776	2/13/2019	9:00 AM	8th Shipment		-54.0	-35.0	-30.8	-32.9	-30.4			-250	-15.9
Sprague 4-6-9 - BH		417528	2/12/2019	2:30 PM	8th Shipment		-49.4	-32.6	-29.0	-31.6	-28.0			-254	-15.4
Sprague 4-6-9 - CSG		417528	2/12/2019	2:40 PM	8th Shipment		-49.1	-32.7	-28.8	-31.9	-28.5			-251	-14.6

GEOMARK

PRODUCED GAS ISOTOPE ANALYSIS

Crestone Peak Resources

Crestone Peak Resources Produced Gases, Colorado

Sample ID	Cylinder ID Number	COGCC ID	Sampling Date	Sampling Time	Shipment	Casing Pressure (psia)	Produce Gas Composition																		
							He Conc. (mole %)	H2 Conc. (mole %)	O2+Ar Conc. (mole %)	N2 Conc. (mole %)	CO2 Conc. (mole %)	H2S Conc. (mole %)	CO Conc. (mole %)	C1 Conc. (mole %)	C2 Conc. (mole %)	C2H4 Conc. (mole %)	C3 Conc. (mole %)	C3H6 Conc. (mole %)	iC4 Conc. (mole %)	nC4 Conc. (mole %)	iC5 Conc. (mole %)	nC5 Conc. (mole %)	C6+ Conc. (mole %)	Specific Gravity (Air = 1.0)	
Billings 22-18 - Production CSG		431459	2/13/2019	11:00 AM	8th Shipment		0.00	0.01	0.98	4.08	1.99	0.00	0.08	77.35	10.16	0.00	3.34	0.00	0.46	0.82	0.25	0.21	0.27	0.711	
Billings 22-18 - Surface CSG		431459	2/13/2019	11:00 AM	8th Shipment		0.00	0.05	0.65	3.87	0.01	0.00	0.10	80.04	7.78	0.00	5.12	0.00	0.51	1.17	0.22	0.24	0.25	0.700	
Branch 1 Well - Production CSG		243009	2/12/2019	9:00 AM	8th Shipment		0.00	0.02	0.69	3.68	0.07	0.00	0.07	76.51	9.76	0.00	5.86	0.00	1.01	1.67	0.33	0.31	0.03	0.730	
Branch 1 Well - Surface CSG		243009	2/12/2019	9:00 AM	8th Shipment		0.00	0.00	5.11	23.25	0.03	0.00	0.04	61.61	4.30	0.00	2.63	0.00	0.58	1.33	0.40	0.39	0.33	0.776	
Coslett 1C-22H - BH		456848	3/4/2019	11:20 AM	8th Shipment		0.00	0.03	2.74	73.96	0.01	0.00	0.03	23.14	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.875	
Coslett B1X - Production CSG		244835	2/19/2019	12:45 PM	8th Shipment		0.00	0.07	0.42	1.67	1.74	0.00	0.00	75.89	12.95	0.00	5.36	0.00	0.64	1.13	0.09	0.04	0.01	0.723	
Coslett B1X - Surface CSG		244835	2/19/2019	12:40 PM	8th Shipment		0.00	0.00	1.52	7.27	0.01	0.00	0.08	75.65	8.42	0.00	4.36	0.00	0.60	1.26	0.29	0.29	0.22	0.720	
Costigan 34-20 - Production CSG		301573	2/26/2019	10:30 AM	8th Shipment		0.00	0.01	4.71	18.31	1.22	0.00	0.07	63.74	7.91	0.00	2.66	0.00	0.34	0.69	0.13	0.13	0.08	0.753	
Costigan 34-20 - Surface CSG		301573	2/26/2019	10:30 AM	8th Shipment		0.00	0.00	20.39	78.23	0.09	0.00	0.01	1.06	0.13	0.00	0.06	0.00	0.01	0.01	0.00	0.00	0.01	0.992	
Costigan 43-20 - Production CSG		301574	2/26/2019	9:30 AM	8th Shipment		0.00	0.02	11.80	45.50	0.84	0.00	0.00	33.72	5.34	0.00	2.00	0.00	0.22	0.45	0.05	0.04	0.01	0.872	
Costigan 43-20 - Surface CSG		301574	2/26/2019	9:30 AM	8th Shipment		0.00	0.01	1.86	7.66	0.02	0.00	0.09	77.25	8.41	0.00	3.03	0.00	0.33	0.71	0.24	0.25	0.14	0.694	
Costigan 6-8-20 - Production CSG		301900	2/26/2019	9:00 AM	8th Shipment		0.00	0.01	15.22	58.55	0.47	0.00	0.00	20.37	3.55	0.00	1.36	0.00	0.17	0.33	0.04	0.03	0.01	0.922	
Costigan 6-8-20 - Surface CSG		301900	2/26/2019	9:00 AM	8th Shipment		0.00	0.01	1.25	5.86	0.01	0.00	0.09	76.40	9.21	0.00	4.71	0.00	0.61	1.23	0.26	0.22	0.13	0.715	
Kenyon 34-19 - Production CSG		420930	2/28/2019	9:10 AM	8th Shipment		0.00	0.37	3.54	13.75	1.11	0.00	0.09	62.18	11.09	0.00	5.09	0.00	0.66	1.56	0.25	0.24	0.06	0.786	
Kenyon 34-19 - Surface CSG		420930	2/28/2019	9:10 AM	8th Shipment		0.00	0.00	3.13	27.57	0.02	0.00	0.08	66.85	8.13	0.00	0.06	0.00	0.02	0.05	0.02	0.03	0.03	0.690	
Kenyon 4-8-19 - Production CSG		420933	2/28/2019	9:00 AM	8th Shipment		0.00	0.17	0.37	1.58	1.74	0.00	0.08	70.60	13.30	0.00	6.93	0.00	1.08	2.76	0.72	0.67	0.01	0.793	
Kenyon 4-8-19 - Surface CSG		420933	2/28/2019	9:00 AM	8th Shipment		0.00	0.01	0.47	20.40	0.01	0.00	0.09	77.63	0.45	0.00	0.36	0.00	0.11	0.18	0.09	0.07	0.13	0.657	
Kenyon 8-4-19 - Production CSG		420935	2/27/2019	3:00 PM	8th Shipment		0.00	0.03	0.60	2.36	1.69	0.00	0.08	73.03	12.88	0.00	5.81	0.00	0.80	1.95	0.39	0.35	0.02	0.757	
Kenyon 8-4-19 - Surface CSG		420935	2/27/2019	3:00 PM	8th Shipment		0.00	0.00	1.59	57.77	0.01	0.00	0.06	40.01	0.17	0.00	0.18	0.00	0.06	0.06	0.03	0.02	0.04	0.808	
Kenyon 8-6-19 - Production CSG		420932	2/27/2019	2:30 PM	8th Shipment		0.00	0.02	4.37	17.04	0.95	0.00	0.06	59.84	10.43	0.00	4.26	0.00	0.60	1.42	0.35	0.40	0.26	0.800	
Kenyon 8-6-19 - Surface CSG		420932	2/27/2019	2:30 PM	8th Shipment		0.00	0.06	20.11	78.57	0.05	0.00	0.00	0.99	0.12	0.00	0.06	0.00	0.01	0.02	0.01	0.00	0.01	0.992	
Kenyon 8-8-19 - Production CSG		420926	2/27/2019	3:30 PM	8th Shipment		0.00	0.00	1.47	5.89	1.02	0.00	0.09	74.32	10.88	0.00	4.00	0.00	0.48	1.03	0.23	0.25	0.32	0.727	
Kenyon 8-8-19 - Surface CSG		420926	2/27/2019	3:30 PM	8th Shipment		0.00	0.00	3.37	25.57	0.02	0.00	0.09	67.55	1.98	0.00	0.89	0.00	0.20	0.33	0.12	0.12	0.18	0.711	
McPeak 14-10 - Production CSG		422444	2/13/2019	3:30 PM	8th Shipment		0.00	0.00	0.60	2.23	2.03	0.00	0.10	72.28	12.63	0.00	5.52	0.00	0.62	2.02	0.56	0.68	0.54	0.775	
McPeak 14-10 - Surface CSG		422444	2/13/2019	3:30 PM	8th Shipment		0.00	0.14	0.64	2.88	0.01	0.00	0.09	78.82	10.24	0.00	4.51	0.00	0.61	1.25	0.33	0.28	0.20	0.708	
McPeak 2-8-10 - Production CSG		431851	2/13/2019	3:00 PM	8th Shipment		0.00	0.56	1.10	4.09	1.95	0.00	0.08	70.37	12.32	0.00	5.38	0.00	0.75	1.83	0.48	0.57	0.50	0.775	
McPeak 2-8-10 - Surface CSG		431851	2/13/2019	3:00 PM	8th Shipment		0.00	0.01	0.42	2.22	0.01	0.00	0.10	77.18	10.73	0.00	5.70	0.00	0.79	1.73	0.37	0.43	0.31	0.733	
McPeak 4-8-10 - Surface CSG		431853	2/13/2019	4:00 PM	8th Shipment		0.00	0.00	20.37	78.35	0.09	0.00	0.00	0.99	0.10	0.00	0.05	0.00	0.01	0.02	0.01	0.01	0.01	0.993	
Melbon Ranch 4C-17H - Production CSG		457071	2/11/2019	1:30 PM	8th Shipment		0.00	0.79	1.14	6.41	0.01	0.00	0.08	69.89	12.45	0.00	5.53	0.00	0.77	1.73	0.39	0.43	0.39	0.759	
Melbon Ranch 4C-17H - Surface CSG		457071	2/11/2019	1:30 PM	8th Shipment		0.00	0.52	0.85	3.29	0.01	0.00	0.07	71.99	14.33	0.00	8.20	0.00	0.53	0.09	0.02	0.02	0.08	0.731	
Melbon Ranch 4D-17H - Production CSG		457075	2/11/2019	1:00 PM	8th Shipment		0.00	0.04	0.78	3.26	0.04	0.00	0.09	69.52	13.84	0.00	6.37	0.00	1.00	2.35	0.77	0.83	1.10	0.807	
Melbon Ranch 4D-17H - Surface CSG		457075	2/11/2019	1:00 PM	8th Shipment		0.00	80.38	0.76	4.27	0.01	0.00	0.00	11.51	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.172	
Melbon Ranch 4E-17H - Production CSG		457067	2/11/2019	12:00 PM	8th Shipment		0.00	0.11	0.86	3.75	0.03	0.00	0.09	72.12	12.82	0.00	5.80	0.00	0.82	1.93	0.50	0.59	0.58	0.768	
Melbon Ranch 4E-17H - Surface CSG		457067	2/11/2019	12:00 PM	8th Shipment		0.00	0.00	20.62	79.29	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.996	
Melbon Ranch 4I-17H - Production CSG		457068	2/11/2019	11:00 AM	8th Shipment		0.00	0.03	1.06	4.47	1.90	0.00	0.09	77.96	12.31	0.00	1.41	0.00	0.17	0.38	0.07	0.08	0.07	0.683	
Melbon Ranch 4I-17H - Surface CSG		457068	2/11/2019	11:00 AM	8th Shipment		0.00	90.04	0.45	3.67	0.01	0.00	0.00	5.81	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.136	
Pratt 0-2-29 - Braden Head		419911	2/28/2019	2:15 PM	8th Shipment		0.00	0.12	2.16	10.98	0.01	0.00	0.09	75.39	6.39	0.00	2.48	0.00	0.37	0.82	0.32	0.38	0.49	0.709	
Pratt 0-2-29 - Production CSG		419911	2/28/2019	2:20 PM	8th Shipment		0.00	0.85	0.55	2.50	1.24	0.00	0.08	74.63	11.98	0.00	5.38	0.00	0.69	1.55	0.24	0.24	0.06	0.729	
Pratt 12-29 - Braden Head		420037	2/28/2019	2:25 PM	8th Shipment		0.00	0.00	0.94	6.55	0.01	0.00	0.11	81.37	5.98	0.00	3.35	0.00	0.57	0.67	0.17	0.13	0.15	0.676	
Pratt 12-29 - Production CSG		420037	2/28/2019	2:30 PM	8th Shipment		0.00	0.06	0.61	2.87	1.32	0.00	0.09	77.44	10.41	0.00	4.12	0.00	0.58	1.29	0.35	0.39	0.48	0.725	
Pratt 21-29 - Braden Head		420033	2/28/2019	2:05 PM	8th Shipment		0.00	0.00	1.58	7.82	0.01	0.00	0.09	77.15	6.30	0.00	4.55	0.00	0.63	1.14	0.26	0.25	0.21	0.711	
Pratt 21-29 - Production CSG		420033	2/28/2019	2:10 PM	8th Shipment		0.00	0.02	0.44	1.85	1.53	0.00	0.09	72.64	14.14	0.00	6.27	0.00	0.92	1.63	0.25	0.17	0.04	0.755	
Pratt 22-29 - Braden Head		420039	2/28/2019	2:45 PM	8th Shipment		0.00	0.18	0.39	2.00	0.01	0.00	0.08	79.15	10.34	0.00	4.98	0.00	0.72	1.42	0.32	0.25	0.17	0.708	
Pratt 22-29 - Production CSG		420039	2/28/2019	2:50 PM	8th Shipment		0.00	0.07	0.39	1.85	1.48	0.00	0.08	77.68	10.77	0.00	4.73	0.00	0.69	1.52	0.30	0.30	0.13	0.723	
Pratt 2-4-29 - Braden Head		419942	2/28/2019	3:25 PM	8th Shipment		0.00	0.10	0.82	4.34	0.01	0.00	0.12	88.59	8.46	0.00	3.66	0.00	0.46	0.77	0.19	0.20	0.29	0.735	
Pratt 2-4-29 - Production CSG		419942	2/28/2019	2:46 PM	8th Shipment		0.00	0.01	2.85	11.40	0.94	0.00	0.08	72.62	8.18	0.00	2.66	0.00	0.35	0.62					

GEOMARK

PRODUCED GAS ISOTOPE ANALYSIS

Crestone Peak ResourcesCrestone Peak Resources Produced Gases, Colorado

Sample ID	Cylinder ID Number	COGCC ID	Sampling Date	Sampling Time	Shipment	Casing Pressure (psia)	Hydrocarbon Gas Composition							
							C1 Conc. (mole %)	C2 Conc. (mole %)	C3 Conc. (mole %)	iC4 Conc. (mole %)	nC4 Conc. (mole %)	iC5 Conc. (mole %)	nC5 Conc. (mole %)	C6+ Conc. (mole %)
Billings 22-18 - Production CSG		431459	2/13/2019	11:00 AM	8th Shipment		83.30	10.94	3.59	0.49	0.89	0.27	0.23	0.29
Billings 22-18 - Surface CSG		431459	2/13/2019	11:00 AM	8th Shipment		83.97	8.16	5.38	0.53	1.22	0.23	0.25	0.26
Branch 1 Well - Production CSG		243009	2/12/2019	9:00 AM	8th Shipment		80.13	10.22	6.14	1.05	1.75	0.35	0.32	0.03
Branch 1 Well - Surface CSG		243009	2/12/2019	9:00 AM	8th Shipment		86.08	6.01	3.67	0.81	1.86	0.56	0.54	0.47
Coslett 1C-22H - BH		456848	3/4/2019	11:20 AM	8th Shipment		99.56	0.32	0.05	0.01	0.01	0.01	0.01	0.03
Coslett B1X - Production CSG		244835	2/19/2019	12:45 PM	8th Shipment		78.97	13.48	5.57	0.66	1.17	0.09	0.04	0.01
Coslett B1X - Surface CSG		244835	2/19/2019	12:40 PM	8th Shipment		83.02	9.25	4.81	0.66	1.38	0.32	0.32	0.24
Costigan 34-20 - Production CSG		301573	2/26/2019	10:30 AM	8th Shipment		84.22	10.46	3.52	0.45	0.91	0.17	0.18	0.10
Costigan 34-20 - Surface CSG		301573	2/26/2019	10:30 AM	8th Shipment		82.56	10.17	4.37	0.56	0.96	0.21	0.20	0.97
Costigan 43-20 - Production CSG		301574	2/26/2019	8:30 AM	8th Shipment		80.60	12.77	4.79	0.52	1.06	0.13	0.10	0.03
Costigan 43-20 - Surface CSG		301574	2/26/2019	9:30 AM	8th Shipment		85.50	9.31	3.35	0.37	0.79	0.26	0.28	0.16
Costigan 6-8-20 - Production CSG		301900	2/26/2019	9:00 AM	8th Shipment		79.10	13.35	5.29	0.67	1.27	0.16	0.12	0.06
Costigan 6-8-20 - Surface CSG		301900	2/26/2019	9:00 AM	8th Shipment		82.34	9.93	5.08	0.66	1.33	0.29	0.24	0.14
Kenyon 34-19 - Production CSG		420930	2/28/2019	9:10 AM	8th Shipment		76.64	13.67	6.27	0.82	1.92	0.31	0.30	0.07
Kenyon 34-19 - Surface CSG		420930	2/28/2019	9:10 AM	8th Shipment		99.51	0.19	0.09	0.03	0.07	0.03	0.04	0.05
Kenyon 4-8-19 - Production CSG		420933	2/28/2019	9:00 AM	8th Shipment		73.49	13.84	7.22	1.12	2.87	0.74	0.70	0.01
Kenyon 4-8-19 - Surface CSG		420933	2/28/2019	9:00 AM	8th Shipment		98.25	0.57	0.46	0.14	0.23	0.11	0.08	0.16
Kenyon 8-4-19 - Production CSG		420935	2/27/2019	3:00 PM	8th Shipment		76.68	13.53	6.10	0.84	2.05	0.41	0.37	0.02
Kenyon 8-4-19 - Surface CSG		420935	2/27/2019	3:00 PM	8th Shipment		98.61	0.43	0.45	0.15	0.16	0.07	0.04	0.10
Kenyon 8-6-19 - Production CSG		420932	2/27/2019	2:30 PM	8th Shipment		77.16	13.45	5.49	0.78	1.83	0.45	0.51	0.34
Kenyon 8-6-19 - Surface CSG		420932	2/27/2019	2:30 PM	8th Shipment		80.74	10.22	4.62	0.99	1.71	0.58	0.40	0.74
Kenyon 8-8-19 - Production CSG		420926	2/27/2019	3:30 PM	8th Shipment		81.21	11.88	4.38	0.52	1.12	0.25	0.28	0.35
Kenyon 8-8-19 - Surface CSG		402926	2/27/2019	3:30 PM	8th Shipment		95.20	2.22	1.25	0.28	0.46	0.17	0.17	0.25
McPeck 14-10 - Production CSG		422444	2/13/2019	3:30 PM	8th Shipment		76.05	13.28	5.81	0.86	2.12	0.59	0.72	0.57
McPeck 14-10 - Surface CSG		422444	2/13/2019	3:30 PM	8th Shipment		81.90	10.64	4.69	0.64	1.30	0.34	0.29	0.21
McPeck 2-8-10 - Production CSG		431851	2/13/2019	3:00 PM	8th Shipment		76.32	13.36	5.84	0.82	1.98	0.53	0.62	0.54
McPeck 2-8-10 - Surface CSG		431851	2/13/2019	3:00 PM	8th Shipment		79.38	11.03	5.86	0.81	1.78	0.38	0.44	0.32
McPeck 4-6-10 - Surface CSG		431853	2/13/2019	4:00 PM	8th Shipment		82.87	8.50	4.34	0.65	1.49	0.60	0.75	0.80
Melbon Ranch 4C-17H - Production CSG		457071	2/11/2019	1:30 PM	8th Shipment		76.32	13.59	6.04	0.84	1.88	0.42	0.47	0.43
Melbon Ranch 4C-17H - Surface CSG		457071	2/11/2019	1:30 PM	8th Shipment		75.58	15.04	8.61	0.56	0.09	0.02	0.02	0.09
Melbon Ranch 4D-17H - Production CSG		457075	2/11/2019	1:00 PM	8th Shipment		72.57	14.45	6.65	1.05	2.45	0.81	0.87	1.15
Melbon Ranch 4D-17H - Surface CSG		457075	2/11/2019	1:00 PM	8th Shipment		99.31	0.64	0.00	0.00	0.00	0.00	0.00	0.04
Melbon Ranch 4E-17H - Production CSG		457067	2/11/2019	12:00 PM	8th Shipment		75.78	13.47	6.09	0.87	2.03	0.52	0.62	0.61
Melbon Ranch 4E-17H - Surface CSG		457067	2/11/2019	12:00 PM	8th Shipment		100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Melbon Ranch 4I-17H - Production CSG		457068	2/11/2019	11:00 AM	8th Shipment		84.33	13.32	1.52	0.18	0.41	0.08	0.08	0.08
Melbon Ranch 4I-17H - Surface CSG		457068	2/11/2019	11:00 AM	8th Shipment		99.54	0.41	0.02	0.00	0.01	0.00	0.00	0.02
Pratt 0-2-29 - Braden Head		419911	2/28/2019	2:15 PM	8th Shipment		87.02	7.38	2.87	0.42	0.94	0.37	0.44	0.57
Pratt 0-2-29 - Production CSG		419911	2/28/2019	2:20 PM	8th Shipment		78.75	12.64	5.68	0.73	1.63	0.26	0.25	0.07
Pratt 12-29 - Braden Head		420037	2/28/2019	2:25 PM	8th Shipment		88.07	6.47	3.63	0.62	0.72	0.19	0.14	0.16
Pratt 12-29 - Production CSG		420037	2/28/2019	2:30 PM	8th Shipment		81.47	10.95	4.33	0.61	1.36	0.37	0.41	0.51
Pratt 21-29 - Braden Head		420033	2/28/2019	2:05 PM	8th Shipment		85.26	6.96	5.03	0.70	1.26	0.29	0.28	0.23
Pratt 21-29 - Production CSG		420033	2/28/2019	2:10 PM	8th Shipment		75.62	14.72	6.53	0.96	1.70	0.26	0.17	0.04
Pratt 22-29 - Braden Head		420039	2/28/2019	2:45 PM	8th Shipment		81.31	10.62	5.12	0.74	1.45	0.33	0.26	0.17
Pratt 22-29 - Production CSG		420039	2/28/2019	2:50 PM	8th Shipment		80.80	11.20	4.92	0.72	1.59	0.32	0.31	0.13
Pratt 2-4-29 - Braden Head		419942	2/28/2019	3:25 PM	8th Shipment		83.03	10.25	4.43	0.55	0.93	0.23	0.24	0.35
Pratt 2-4-29 - Production CSG		419942	2/28/2019	2:46 PM	8th Shipment		85.73	9.66	3.13	0.41	0.73	0.15	0.12	0.07
Pratt 4-2-29 - Braden Head		420035	2/28/2019	2:55 PM	8th Shipment		80.64	11.79	5.40	0.59	1.15	0.19	0.16	0.08
Pratt 4-2-29 - Production CSG		420035	2/28/2019	3:00 PM	8th Shipment		80.11	11.82	5.35	0.74	1.76	0.22	0.00	0.01
Regnier Farms 31-19 - Production CSG		288768	2/12/2019	1:00 PM	8th Shipment		76.29	12.54	7.48	1.09	2.37	0.16	0.05	0.02
Regnier Farms 31-19 - Surface CSG		288768	2/12/2019	1:00 PM	8th Shipment		89.14	6.96	2.66	0.33	0.62	0.11	0.09	0.09
Regnier Farms 32-19 - Production CSG		282677	2/12/2019	2:30 PM	8th Shipment		75.11	12.63	6.17	1.09	2.70	0.92	0.94	0.45
Regnier Farms 32-19 - Surface CSG		282677	2/12/2019	2:30 PM	8th Shipment		89.66	3.85	3.53	0.94	1.00	0.35	0.25	0.42
Regnier Farms 42-19 - Production CSG		270352	2/13/2019	8:30 AM	8th Shipment		76.72	11.70	5.32	1.03	2.68	0.96	1.11	0.48
Regnier Farms 42-19 - Surface CSG		270352	2/13/2019	8:30 AM	8th Shipment		90.79	2.69	3.56	0.97	1.08	0.36	0.30	0.23
Regnier Farms 43-19 - Production CSG		276476	2/15/2019	9:00 AM	8th Shipment		80.89	11.52	5.01	0.65	1.47	0.24	0.19	0.02
Regnier Farms 43-19 - Surface CSG		276476	2/15/2019	9:00 AM	8th Shipment		89.85	5.14	3.41	0.59	0.71	0.15	0.10	0.05
Regnier Farms B Unit 1 - Surface CSG		243779	2/13/2019	9:00 AM	8th Shipment		84.87	9.37	4.84	0.52	0.98	0.19	0.13	0.11
Sprague 4-6-9 - BH		417528	2/12/2019	2:30 PM	8th Shipment		78.82	12.35	5.54	0.71	1.62	0.36	0.36	0.25
Sprague 4-6-9 - CSG		417528	2/12/2019	2:40 PM	8th Shipment		79.45	12.60	6.03	0.88	0.00	0.52	0.50	0.01

GEOMARK

PRODUCED GAS ISOTOPE ANALYSIS

Crestone Peak Resources

Crestone Peak Resources Produced Gases, Colorado

Sample ID	Cylinder ID Number	COGCC ID	Sampling Date	Sampling Time	Shipment	Casing Pressure (psia)	BTU Content		Calculated Ratios			
							Total Gas (BTU/lb3)	Hydrocar. Gas (BTU/lb3)	Total HC Gas (ppm by mole)	Wetness (C2 - nC5)	C1/C2 Ratio (mole/mole)	iC4/nC4 Ratio (mole/mole)
Billings 22-18 - Production CSG		431459	2/13/2019	11:00 AM	8th Shipment		1,118	1,204	928,656	16.46	8	0.56
Billings 22-18 - Surface CSG		431459	2/13/2019	11:00 AM	8th Shipment		1,160	1,217	953,165	15.81	10	0.43
Branch 1 Well - Production CSG		243009	2/12/2019	9:00 AM	8th Shipment		1,207	1,264	954,737	19.94	8	0.60
Branch 1 Well - Surface CSG		243009	2/12/2019	9:00 AM	8th Shipment		874	1,221	715,739	13.51	14	0.44
Coslett 1C-22H - BH		456848	3/4/2019	11:20 AM	8th Shipment		236	1,015	232,369	0.40	313	0.54
Coslett B1X - Production CSG		244835	2/19/2019	12:45 PM	8th Shipment		1,193	1,242	960,965	21.03	6	0.56
Coslett B1X - Surface CSG		244835	2/19/2019	12:40 PM	8th Shipment		1,118	1,227	911,154	16.76	9	0.47
Costigan 34-20 - Production CSG		301573	2/26/2019	10:30 AM	8th Shipment		898	1,187	756,808	15.70	8	0.49
Costigan 34-20 - Surface CSG		301573	2/26/2019	10:30 AM	8th Shipment		16	1,236	12,831	16.63	8	0.58
Costigan 43-20 - Production CSG		301574	2/26/2019	9:30 AM	8th Shipment		512	1,223	418,391	19.38	6	0.49
Costigan 43-20 - Surface CSG		301574	2/26/2019	9:30 AM	8th Shipment		1,065	1,179	903,592	14.37	9	0.47
Costigan 6-8-20 - Production CSG		301900	2/26/2019	9:00 AM	8th Shipment		321	1,245	257,469	20.86	6	0.53
Costigan 6-8-20 - Surface CSG		301900	2/26/2019	9:00 AM	8th Shipment		1,139	1,228	927,806	17.54	8	0.50
Kernyon 34-19 - Production CSG		420930	2/28/2019	9:10 AM	8th Shipment		1,047	1,291	811,297	23.30	6	0.43
Kernyon 34-19 - Surface CSG		420930	2/28/2019	9:10 AM	8th Shipment		705	1,019	691,926	0.44	530	0.43
Kernyon 4-8-19 - Production CSG		420933	2/28/2019	9:00 AM	8th Shipment		1,304	1,357	960,674	26.50	5	0.39
Kernyon 4-8-19 - Surface CSG		420933	2/28/2019	9:00 AM	8th Shipment		823	1,041	790,210	1.59	172	0.61
Kernyon 8-4-19 - Production CSG		420935	2/27/2019	3:00 PM	8th Shipment		1,232	1,294	952,370	23.30	6	0.41
Kernyon 8-4-19 - Surface CSG		420935	2/27/2019	3:00 PM	8th Shipment		419	1,034	405,744	1.29	230	0.98
Kernyon 8-6-19 - Production CSG		420932	2/27/2019	2:30 PM	8th Shipment		1,004	1,295	775,558	22.58	6	0.42
Kernyon 8-6-19 - Surface CSG		420932	2/27/2019	2:30 PM	8th Shipment		16	1,275	12,211	18.66	8	0.58
Kernyon 8-8-19 - Production CSG		420926	2/27/2019	3:30 PM	8th Shipment		1,128	1,232	915,179	18.50	7	0.47
Kernyon 8-8-19 - Surface CSG		402526	2/27/2019	3:30 PM	8th Shipment		767	1,062	709,520	4.56	43	0.60
McPeck 14-10 - Production CSG		422444	2/13/2019	3:30 PM	8th Shipment		1,260	1,326	950,371	23.51	6	0.40
McPeck 14-10 - Surface CSG		422444	2/13/2019	3:30 PM	8th Shipment		1,185	1,231	962,322	17.93	8	0.49
McPeck 2-8-10 - Production CSG		431851	2/13/2019	3:00 PM	8th Shipment		1,214	1,317	922,072	23.27	6	0.41
McPeck 2-8-10 - Surface CSG		431851	2/13/2019	3:00 PM	8th Shipment		1,242	1,277	972,363	20.37	7	0.46
McPeck 4-8-10 - Surface CSG		431853	2/13/2019	4:00 PM	8th Shipment		15	1,259	11,921	16.46	10	0.44
Melbon Ranch 4C-17H - Production CSG		457071	2/11/2019	1:30 PM	8th Shipment		1,198	1,308	915,762	23.35	6	0.45
Melbon Ranch 4C-17H - Surface CSG		457071	2/11/2019	1:30 PM	8th Shipment		1,213	1,273	952,582	24.36	5	6.15
Melbon Ranch 4D-17H - Production CSG		457075	2/11/2019	1:00 PM	8th Shipment		1,333	1,392	957,963	26.59	5	0.43
Melbon Ranch 4D-17H - Surface CSG		457075	2/11/2019	1:00 PM	8th Shipment		118	1,016	115,907	0.65	155	0.39
Melbon Ranch 4E-17H - Production CSG		457067	2/11/2019	12:00 PM	8th Shipment		1,262	1,327	951,661	23.75	6	0.43
Melbon Ranch 4E-17H - Surface CSG		457067	2/11/2019	12:00 PM	8th Shipment		0	1,010	8	0.00	#DIV/0!	#DIV/0!
Melbon Ranch 4I-17H - Production CSG		457068	2/11/2019	11:00 AM	8th Shipment		1,068	1,155	924,533	15.61	6	0.44
Melbon Ranch 4I-17H - Surface CSG		457068	2/11/2019	11:00 AM	8th Shipment		59	1,014	58,329	0.45	243	0.55
Pratt 0-2-29 - Braden Head		419911	2/28/2019	2:15 PM	8th Shipment		1,027	1,185	866,406	12.49	12	0.45
Pratt 0-2-29 - Production CSG		419911	2/28/2019	2:20 PM	8th Shipment		1,196	1,262	947,726	21.20	6	0.44
Pratt 12-29 - Braden Head		420037	2/28/2019	2:25 PM	8th Shipment		1,072	1,160	923,991	11.79	14	0.86
Pratt 12-29 - Production CSG		420037	2/28/2019	2:30 PM	8th Shipment		1,163	1,245	950,501	18.12	7	0.45
Pratt 21-29 - Braden Head		420033	2/28/2019	2:05 PM	8th Shipment		1,093	1,208	904,537	14.54	12	0.56
Pratt 21-29 - Production CSG		420033	2/28/2019	2:10 PM	8th Shipment		1,244	1,295	960,623	24.35	5	0.57
Pratt 22-29 - Braden Head		420039	2/28/2019	2:45 PM	8th Shipment		1,208	1,241	973,496	18.55	8	0.51
Pratt 22-29 - Production CSG		420039	2/28/2019	2:50 PM	8th Shipment		1,197	1,245	961,369	19.09	7	0.46
Pratt 2-4-29 - Braden Head		419942	2/28/2019	3:25 PM	8th Shipment		1,004	1,215	828,133	16.68	8	0.59
Pratt 2-4-29 - Production CSG		419942	2/28/2019	2:46 PM	8th Shipment		988	1,167	847,135	14.21	9	0.56
Pratt 4-2-29 - Braden Head		420035	2/28/2019	2:55 PM	8th Shipment		1,191	1,233	965,667	19.30	7	0.52
Pratt 4-2-29 - Production CSG		420035	2/28/2019	3:00 PM	8th Shipment		1,156	1,243	929,663	19.89	7	0.42
Regnier Farms 31-19 - Production CSG		288768	2/12/2019	1:00 PM	8th Shipment		1,095	1,303	840,435	23.70	6	0.46
Regnier Farms 31-19 - Surface CSG		288768	2/12/2019	1:00 PM	8th Shipment		1,076	1,134	949,350	10.78	13	0.53
Regnier Farms 32-19 - Production CSG		282677	2/12/2019	2:30 PM	8th Shipment		1,287	1,357	948,412	24.55	6	0.40
Regnier Farms 32-19 - Surface CSG		282677	2/12/2019	2:30 PM	8th Shipment		131	1,170	111,581	9.96	23	0.94
Regnier Farms 42-19 - Production CSG		207352	2/13/2019	8:30 AM	8th Shipment		986	1,242	734,267	22.91	7	0.38
Regnier Farms 42-19 - Surface CSG		270352	2/13/2019	8:30 AM	8th Shipment		1,072	1,159	925,258	8.99	34	0.89
Regnier Farms 43-19 - Production CSG		276476	2/15/2019	9:00 AM	8th Shipment		1,119	1,234	906,249	19.09	7	0.44
Regnier Farms 43-19 - Surface CSG		276476	2/15/2019	9:00 AM	8th Shipment		908	1,139	797,209	10.10	17	0.83
Regnier Farms B Unit 1 - Surface CSG		243778	2/13/2019	9:00 AM	8th Shipment		1,036	1,194	867,706	15.03	10	0.53
Sprague 4-6-9 - BH		417528	2/12/2019	2:30 PM	8th Shipment		1,162	1,270	914,530	20.99	6	0.44
Sprague 4-6-9 - CSG		417528	2/12/2019	2:40 PM	8th Shipment		1,188	1,247	952,859	20.54	6	#DIV/0!