



Produced Gas Isotope and Compositional Analyses

**Crestone Peak Resources Produced Gases
Colorado**

Crestone Peak Resources

March 27, 2019

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	Tubing Pressure (psia)	Casing Pressure (psia)	Stable Carbon Isotopes							δD Methane (‰)	δ ¹³ C CO ₂ (‰)
							δ ¹³ C Methane (‰)	δ ¹³ C Ethane (‰)	δ ¹³ C Propane (‰)	δ ¹³ C i-Butane (‰)	δ ¹³ C n-Butane (‰)	δ ¹³ C i-Pentane (‰)	δ ¹³ C n-Pentane (‰)		
Anderson 4-2-32 - Production CSG		420311	11/15/2018	8:00 AM			-48.7	-33.7	-29.2	-32.8	-28.9			-249	-7.9
Anderson 4-2-32 - Surface CSG		420311	11/15/2018	8:05 AM			-52.4	-34.4	-29.9	-33.6	-30.5			-248	
Aristocrat 4-0-3 - Production CSG		421915	1/11/2019	9:30 AM			-46.2	-30.2	-29.5	-30.3	-26.6			-231	1.3
Aristocrat 4-0-3 - Surface CSG		421915	1/11/2019	9:30 AM			-49.3	-33.3	-28.9	-31.2	-27.4			-244	
Bell 34-26 - Production CSG		256596	10/19/2018	1:30 AM			-48.7	-29.9	-27.3	-30.3	-27.6			-251	-1.3
Cosslett 32-22 - Production CSG		420875	11/1/2018	9:00 AM			-49.3	-32.7	-28.4	-31.5	-28.1			-241	-2.7
Cosslett 32-22 - Surface CSG		420875	11/1/2018	9:00 AM			-52.1	-33.4	-28.9	-32.4	-28.3			-249	-13.8
Cosslett 4-0-22 - Production CSG		420763	11/1/2018	8:00 AM			-49.3	-32.9	-28.1	-32.1	-28.2			-242	0.1
Cosslett 4-0-22 - Surface CSG		420763	11/1/2018	8:00 AM			-53.3	-33.6	-28.8	-32.2	-28.3			-249	-15.0
Cosslett 6-4-22 - Production CSG		420884	11/1/2018	10:30 AM			-48.8	-32.9	-27.3	-31.9	-27.6			-241	0.1
Cosslett 6-4-22 - Surface CSG		420884	11/1/2018	10:30 AM			-50.1	-33.6	-28.7	-33.2	-28.5			-244	-11.9
Cosslett B1X - Production CSG		244835	12/21/2018	-			-49.3	-33.3	-28.3	-31.9	-28.5			-250	-11.4
Cosslett B1X - Surface CSG		244835	12/21/2018	-			-52.3	-34.2	-29.2	-32.3	-29.4			-249	-17.0
Davis 1D-9H - Production CSG		454502	1/21/2019	2:30 AM			-48.4	-33.5	-28.3	-31.1	-28.0			-249	-5.6
Davis 1D-9H - Surface CSG		454502	1/21/2019	2:30 AM			-49.0	-31.6	-24.7					-248	
Davis 1F-9H - Production CSG		454371	1/21/2019	3:30 AM			-49.3	-32.3	-27.3	-35.8	-27.4			-252	-14.4
Davis 1F-9H - Surface CSG		454371	1/21/2019	3:30 AM			-48.7	-33.0	-27.3	-27.9	-27.6			-252	-13.7
Davis 1G-9H - Production CSG		454358	1/21/2019	4:00 AM			-48.3	-32.9	-28.4	-31.6	-28.1			-245	-12.4
Davis 1G-9H - Surface CSG		454358	1/21/2019	4:00 AM			-49.3	-31.6	-27.2					-239	-14.5
Davis 1H-9H - Production CSG		454363	1/23/2019	9:30 AM			-49.8	-33.3	-28.4	-31.3	-28.4			-253	-10.2
Davis 1H-9H - Surface CSG		454363	1/23/2019	9:30 AM			-49.3	-32.6	-27.9					-236	-14.5
Davis 1I-9H - Production CSG		454852	1/23/2019	10:00 AM			-50.8	-34.3	-28.4	-30.3	-28.6			-251	-6.2
Davis 1I-9H - Surface CSG		454852	1/23/2019	10:00 AM			-50.3	-34.2	-28.3	-30.3	-28.3			-255	
Davis 1J-9H - Production CSG		454359	1/23/2019	10:30 AM			-48.0	-32.6	-28.5	-29.6	-28.7			-245	-12.0
Davis 1J-9H - Surface CSG		454359	1/23/2019	10:30 AM			-49.3	-33.5	-28.3	-29.2	-28.8			-252	-14.8
Davis 1K-9H - Production CSG		454368	1/23/2019	11:00 AM			-49.6	-34.5	-28.7	-28.4	-28.6			-263	1.0
Davis 1K-9H - Surface CSG		454368	1/23/2019	11:00 AM			-48.0	-34.3	-28.7	-29.4	-29.0			-259	-3.6
Davis 1L-9H - Production CSG		454687	1/23/2019	11:30 AM			-49.4	-34.5	-29.0	-29.6	-28.8			-264	0.9
Davis 1L-9H - Surface CSG		454687	1/23/2019	11:30 AM			-51.3	-34.9	-28.3	-29.2	-28.6			-259	-18.2
Davis 1M-9H - Production CSG		454370	1/23/2019	12:00 PM			-48.0	-32.5	-27.9	-29.6	-28.0			-254	-8.6
Davis 1M-9H - Surface CSG		454370	1/23/2019	12:00 PM			-52.1	-32.8	-28.2	-30.1	-28.6			-256	-16.1
Davis 1N-9H - Production CSG		454357	1/23/2019	12:30 PM			-49.1	-33.2	-28.2	-29.5	-28.2			-253	-10.7
Davis 1N-9H - Surface CSG		454357	1/23/2019	12:30 PM			-55.4	-33.2	-27.9	-30.8	-28.1			-230	-14.3
Davis 1O-9H - Production CSG		454355	1/23/2019	1:00 AM			-49.0	-33.1	-27.9	-31.0	-27.9			-258	-12.4
Davis 1O-9H - Surface CSG		454355	1/23/2019	1:00 AM			-50.1	-34.4	-28.8					-246	-16.0
Davis 1Q-9H - Production CSG		454362	1/23/2019	1:30 AM			-49.0	-33.0	-28.6	-31.1	28.5			-256	-12.8
Davis 1Q-9H - Surface CSG		454362	1/23/2019	1:30 AM			-43.7	-33.2	-28.3	-30.1	-28.0			-252	-15.1
Davis 1R-9H - Production CSG		454356	1/23/2019	2:00 AM			-48.1	-32.2	-28.1	-30.7	-28.1			-252	-10.3
Davis 1R-9H - Surface CSG		454356	1/23/2019	2:00 AM			-49.6	-32.2	-25.3					-254	-17.5
Davis 1T-9H - Production CSG		454367	1/23/2019	2:00 AM			-48.8	-33.7	-29.1	-30.9	-28.4			-249	-14.6
Davis 1T-9H - Surface CSG		454367	1/23/2019	2:00 AM			-52.5	-33.6	-29.0					-249	-14.4
Dier 33-8 - Production CSG		256299	1/21/2019	12:16 PM			-49.7	-34.2	-29.7	-31.8	-28.8			-263	-14.3
Dier 33-8 - Surface CSG		256299	1/21/2019	-			-51.7	-34.3	-29.6	-31.7	-29.4			-266	
Elmqvist 21-23 - Production CSG		276477	10/30/2018	8:45 AM			-49.6	-33.8	-28.8	-32.1	-28.7			-254	-0.9
Elmqvist 4-4-23 - Production CSG		418698	10/29/2018	3:03 AM			-49.6	-32.6	-28.7	-32.8	-29.3			-254	0.8
Elmqvist 4-4-23 - Surface CSG		418698	10/29/2018	2:55 AM			-59.7	-38.5	-29.6	-32.2	-28.9			-242	-0.2
File 3A-32H - Production CSG		452934	10/4/2018	10:40 AM			-49.1	-31.9	-29.6	-31.8	-28.8			-253	-10.7
File 3A-32H - Surface CSG		452934	10/4/2018	10:40 AM			-49.5	-29.3	-28.5	-28.3	-24.4			-254	
Geist 22-32 - Production CSG		266935	10/25/2018	1:00 AM			-48.2	-32.3	-27.5	-32.1	-27.4			-239	1.0
Geist A 1 - Production CSG		243676	10/25/2018	-			-49.7	-33.4	-29.9	-32.4	-29.1			-254	0.3
Geist A 1 - Surface CSG		243676	10/25/2018	11:30 AM			-52.7	-35.2	-30.1	-33.5	-30.1			-251	-14.9
Haley 41-22 - Production CSG		277424	11/1/2018	1:25 AM			-49.2	-33.8	-29.1	-31.1	-28.2			-253	-4.1
Haley 4-2-22 - Production CSG		301057	11/1/2018	11:25 AM			-47.9	-33.6	-30.1	-31.9	-29.7			-251	1.3
Haley 4-2-22 - Surface CSG		301057	11/1/2018	11:20 AM			-52.8	-33.4	-30.2	-31.0	-30.3			-241	-11.1
Haley 8-4-22 - Production CSG		301056	11/1/2018				-49.2	-33.6	-29.4	-31.6	-29.4			-249	-0.4
Haley 8-4-22 - Surface CSG		301056	11/1/2018	11:30 AM			-53.7	-33.6	-28.2	-31.2	-27.9			-258	-16.0
Herren 1 - Production CSG		241069	10/1/2018	8:40 AM			-50.7	-33.6	-29.7	-32.0	-29.2			-263	-6.5
Herren 1 - Surface CSG		241069	9/19/2018	1:00 AM			-50.0	-32.4	-28.2	-31.4	-28.8			-255	-14.8
Herren 1B-33H - Production CSG		457034	1/21/2019	12:00 PM			-52.2	-36.1	-30.3	-31.5	-29.7			-263	
Herren 1B-33H - Surface CSG		457034	1/21/2019	9:00 AM			-51.1	-34.6	-29.9	-31.6	-28.9			-262	
Herren 1C-33H - Surface CSG		457039	1/21/2019	9:00 AM			-50.5	-32.1	-28.4					-259	-15.6
Herren 1D-33H - Surface CSG		457038	1/21/2019	9:00 AM			-50.1	-33.6	-28.7					-258	-17.0
Herren 1E-33H - Surface CSG		457033	1/21/2019	9:30 AM			-53.3	-33.2	-29.1					-257	-15.5
Herren 1F-33H - Surface CSG		457035	1/21/2019	12:00 PM			-51.6	-33.9	-28.6					-250	-19.6
Herren 1C-33H - Surface CSG		457037	1/21/2019	10:30 AM			-49.6	-33.2	-29.0	-31.4	-28.4			-253	-15.7
Herren 1H-33H - Surface CSG		457038	1/21/2019	12:00 PM			-52.7	-33.1	-28.8					-241	-14.1
Herren 1I-33H - Surface CSG		457038	1/21/2019	11:30 AM			-50.2	-33.3	-29.3	-31.6	-28.8			-258	-13.2
Herren 1J-33H - Surface CSG		457040	1/21/2019	9:30 AM			-50.4	-33.5	-29.3					-257	-15.8
Herren 31-33 - Surface CSG		265302	1/22/2019	-			-52.3	-33.8	-29.2	-32.1	-29.4			-263	-17.0
Herren 42-33 - Production CSG		260651	9/13/2018	8:45 AM			-49.0	-32.8	-29.4	-31.8	-28.7			-260	-6.5
Herren 42-33 - Surface CSG		260651	9/13/2018	8:45 AM			-52.9	-33.2	-29.2	-31.2	-29.0			-252	-16.8
Hwy 52 4B-32H - Production CSG		434579	12/4/2018	9:30 AM			-49.1	-33.5	-28.8	-32.3	-29.3			-251	0.8
Hwy 52 4B-32H - Surface CSG		434579	12/4/2018	9:35 AM			-48.4	-32.8	-29.2	-32.1	-29.5			-252	0.8



PRODUCED GAS ISOTOPE ANALYSIS

Crestone Peak Resources Crestone Peak Resources Produced Gases, Colorado

Sample ID	Cylinder ID Number	COGCC ID	Sampling Date	Sampling Time	Tubing Pressure (psia)	Casing Pressure (psia)	Produce Gas Composition														Specific Gravity (Air = 1.0)
							H ₂ Conc. (mole %)	H ₂ Conc. (mole %)	O ₂ +Ar Conc. (mole %)	N ₂ Conc. (mole %)	CO ₂ Conc. (mole %)	H ₂ S 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 %)	
Anderson 4-2-32 - Production CSG	420311	11/15/2018	8:00 AM	0.00	0.01	0.23	1.31	0.38	0.00	0.03	82.42	10.68	0.00	3.50	0.00	0.35	0.72	0.12	0.12	0.13	0.673
Anderson 4-2-32 - Surface CSG	420311	11/15/2018	8:05 AM	0.00	0.00	0.23	1.96	0.00	0.00	0.03	81.18	9.46	0.00	4.94	0.00	0.62	1.21	0.00	0.21	0.16	0.692
Aristocrat 4-0-3 - Production CSG	421915	11/11/2018	9:30 AM	0.00	0.01	0.22	0.84	2.77	0.00	0.00	75.68	11.72	0.00	4.57	0.00	0.83	1.67	0.52	0.46	0.11	0.741
Aristocrat 4-0-3 - Surface CSG	421915	11/11/2018	9:30 AM	0.00	0.03	0.22	1.12	0.00	0.00	0.00	80.20	11.21	0.00	4.85	0.00	0.67	1.07	0.27	0.16	0.18	0.699
Bell 34-26 - Production CSG	256596	10/19/2018	1:30 AM	0.00	0.05	1.17	4.62	3.10	0.00	0.00	65.06	14.69	0.00	6.07	0.00	1.25	2.18	0.95	0.63	0.23	0.825
Cosslett 32-22 - Production CSG	420675	11/11/2018	9:00 AM	0.00	1.08	0.20	1.04	0.64	0.00	0.03	75.64	12.27	0.00	5.45	0.00	0.78	1.80	0.41	0.43	0.23	0.732
Cosslett 32-22 - Surface CSG	420675	11/11/2018	9:00 AM	0.00	0.04	0.25	2.08	0.00	0.00	0.03	82.32	9.36	0.00	4.17	0.00	0.43	0.84	0.16	0.16	0.15	0.678
Cosslett 4-0-22 - Production CSG	420763	11/11/2018	8:00 AM	0.00	0.69	0.26	1.45	1.00	0.00	0.03	76.30	12.08	0.00	5.21	0.00	0.68	1.48	0.30	0.29	0.23	0.725
Cosslett 4-0-22 - Surface CSG	420763	11/11/2018	8:00 AM	0.00	0.00	0.29	3.80	0.00	0.00	0.03	81.05	7.76	0.00	4.49	0.00	0.69	1.20	0.27	0.24	0.16	0.694
Cosslett 6-4-22 - Production CSG	420884	11/11/2018	10:30 AM	0.00	0.81	0.37	1.46	0.00	0.00	0.03	73.08	12.25	0.00	5.84	0.00	0.84	2.04	0.48	0.53	0.40	0.763
Cosslett 6-4-22 - Surface CSG	420884	11/11/2018	10:30 AM	0.00	0.06	0.29	1.95	0.00	0.00	0.03	79.82	9.90	0.00	4.98	0.00	0.64	1.44	0.31	0.33	0.26	0.708
Cosslett B1X - Production CSG	244835	12/21/2018	-	0.00	0.07	0.31	1.29	1.76	0.00	0.00	75.25	13.05	0.00	5.74	0.00	0.77	1.50	0.17	0.09	0.02	0.735
Cosslett B1X - Surface CSG	244835	12/21/2018	-	0.00	0.00	0.23	2.23	0.01	0.00	0.00	80.69	9.20	0.00	4.74	0.00	0.63	1.37	0.31	0.32	0.27	0.703
Davis 10-9H - Production CSG	454502	1/21/2019	2:30 AM	0.00	0.14	0.18	1.51	0.19	0.00	0.00	78.36	12.55	0.00	4.55	0.00	0.58	1.23	0.26	0.26	0.19	0.708
Davis 10-9H - Surface CSG	454502	1/21/2019	2:30 AM	0.00	47.54	0.16	3.43	0.00	0.00	0.00	46.98	1.80	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.348
Davis 1F-9H - Production CSG	454371	1/21/2019	3:30 AM	0.00	92.57	0.35	6.50	0.01	0.00	0.00	0.46	0.05	0.00	0.02	0.00	0.00	0.01	0.00	0.01	0.03	0.136
Davis 1F-9H - Surface CSG	454371	1/21/2019	3:30 AM	0.00	0.11	0.27	1.80	0.01	0.00	0.00	82.50	10.43	0.00	2.97	0.00	0.37	0.97	0.21	0.22	0.13	0.673
Davis 1G-9H - Production CSG	454358	1/21/2019	4:00 AM	0.00	0.18	0.19	1.99	0.04	0.00	0.00	76.76	13.41	0.00	4.75	0.00	0.58	1.24	0.26	0.27	0.33	0.718
Davis 1G-9H - Surface CSG	454358	1/21/2019	4:00 AM	0.00	90.30	0.16	3.64	0.01	0.00	0.00	5.78	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.01	0.134
Davis 1H-9H - Production CSG	454363	1/23/2019	9:30 AM	0.00	0.16	0.33	2.92	0.02	0.00	0.00	79.57	12.22	0.00	3.25	0.00	0.33	0.81	0.13	0.13	0.11	0.662
Davis 1H-9H - Surface CSG	454363	1/23/2019	9:30 AM	0.00	91.36	0.14	4.59	0.01	0.00	0.00	3.81	0.06	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.132
Davis 1H-9H - Production CSG	454852	1/23/2019	10:00 AM	0.00	0.14	0.18	1.68	0.13	0.00	0.00	78.24	13.01	0.00	4.73	0.00	0.51	1.03	0.15	0.14	0.07	0.701
Davis 1H-9H - Surface CSG	454852	1/23/2019	10:00 AM	0.00	6.89	0.35	5.19	0.00	0.00	0.00	79.82	6.51	0.01	1.12	0.00	0.06	0.02	0.00	0.00	0.01	0.588
Davis 1J-9H - Production CSG	454359	1/23/2019	10:30 AM	0.00	0.14	0.28	1.53	0.10	0.00	0.00	77.15	12.88	0.00	4.82	0.00	0.67	1.41	0.36	0.32	0.34	0.723
Davis 1J-9H - Surface CSG	454359	1/23/2019	10:30 AM	0.00	0.96	0.22	1.54	0.01	0.00	0.00	82.48	10.61	0.00	3.28	0.00	0.34	0.48	0.05	0.02	0.01	0.654
Davis 1K-9H - Production CSG	454368	1/23/2019	11:00 AM	0.00	0.02	0.32	1.57	2.19	0.00	0.00	79.12	14.93	0.00	1.19	0.00	0.15	0.37	0.06	0.09	0.09	0.673
Davis 1K-9H - Surface CSG	454368	1/23/2019	11:00 AM	0.00	4.29	0.26	2.01	0.52	0.00	0.00	76.87	14.31	0.00	1.08	0.00	0.13	0.34	0.07	0.08	0.06	0.659
Davis 1L-9H - Production CSG	454687	1/23/2019	11:30 AM	0.00	0.02	0.71	3.07	2.13	0.00	0.00	78.20	14.54	0.00	0.83	0.00	0.10	0.25	0.05	0.06	0.05	0.678
Davis 1L-9H - Surface CSG	454687	1/23/2019	11:30 AM	0.00	7.39	0.75	5.91	0.01	0.00	0.00	73.92	9.62	0.00	2.27	0.00	0.09	0.04	0.00	0.01	0.01	0.617
Davis 1M-9H - Production CSG	454370	1/23/2019	12:00 PM	0.00	0.12	0.12	1.02	0.11	0.00	0.00	76.30	13.47	0.00	5.43	0.00	0.76	1.60	0.38	0.34	0.35	0.734
Davis 1M-9H - Surface CSG	454370	1/23/2019	12:00 PM	0.00	76.36	0.17	23.15	0.01	0.00	0.00	0.20	0.05	0.00	0.03	0.00	0.00	0.01	0.00	0.00	0.01	0.282
Davis 1N-9H - Production CSG	454357	1/23/2019	12:30 PM	0.00	0.12	0.38	1.95	0.14	0.00	0.00	76.41	12.48	0.00	4.96	0.00	0.64	1.46	0.45	0.37	0.45	0.735
Davis 1N-9H - Surface CSG	454357	1/23/2019	12:30 PM	0.00	79.18	1.92	12.24	0.02	0.00	0.00	4.86	0.03	0.00	0.09	0.00	0.07	0.29	0.23	0.29	0.77	0.267
Davis 1O-9H - Production CSG	454355	1/23/2019	1:00 AM	0.00	0.09	0.30	1.68	0.10	0.00	0.00	79.31	12.22	0.00	4.28	0.00	0.47	0.95	0.18	0.12	0.22	0.697
Davis 1O-9H - Surface CSG	454355	1/23/2019	1:00 AM	0.00	93.15	0.17	4.33	0.01	0.00	0.00	2.31	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.122
Davis 1Q-9H - Production CSG	454362	1/23/2019	1:30 AM	0.00	0.14	0.27	1.46	0.05	0.00	0.00	80.54	11.85	0.00	3.79	0.00	0.40	0.84	0.16	0.18	0.31	0.687
Davis 1Q-9H - Surface CSG	454362	1/23/2019	1:30 AM	0.00	1.46	0.40	3.02	0.00	0.00	0.00	74.74	12.97	0.00	5.49	0.00	0.58	1.05	0.12	0.07	0.09	0.707
Davis 1R-9H - Production CSG	454366	1/23/2019	2:00 AM	0.00	0.15	0.33	1.75	0.09	0.00	0.00	77.33	13.15	0.00	4.59	0.00	0.57	1.12	0.28	0.27	0.37	0.715
Davis 1R-9H - Surface CSG	454366	1/23/2019	2:00 AM	0.00	0.31	0.17	2.97	0.01	0.00	0.00	73.16	2.10	0.00	2.99	0.00	0.00	0.00	0.00	0.00	0.02	0.475
Davis 1T-9H - Production CSG	454367	1/23/2019	2:00 AM	0.00	0.07	0.24	1.46	0.06	0.00	0.00	78.21	12.10	0.00	4.62	0.00	0.62	1.43	0.36	0.41	0.42	0.720
Davis 1T-9H - Surface CSG	454367	1/23/2019	2:00 AM	0.00	84.11	0.22	4.14	0.01	0.00	0.00	11.39	0.12	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.166
Dier 33-8 - Production CSG	256299	1/21/2019	12:16 PM	0.00	0.06	0.23	1.17	1.98	0.00	0.00	74.39	14.22	0.00	6.74	0.00	0.88	0.00	0.24	0.10	0.00	0.732
Dier 33-8 - Surface CSG	256299	1/21/2019	12:16 PM	0.00	0.00	0.28	1.84	0.00	0.00	0.00	73.49	11.07	0.00	4.56	0.00	0.54	1.38	0.26	0.32	0.22	0.706
Elmqvist 21-23 - Production CSG	276477	10/30/2018	8:45 AM	0.00	0.01	0.37	1.53	1.74	0.00	0.03	74.93	12.85	0.00	5.61	0.00	0.73	1.79	0.24	0.17	0.00	0.740
Elmqvist 4-4-23 - Production CSG	418698	10/29/2018	3:03 AM	0.00	0.17	0.66	2.57	1.79	0.00	0.03	71.28	12.80	0.00	6.04	0.00	0.86	2.29	0.62	0.76	0.12	0.781
Elmqvist 4-4-23 - Surface CSG	418698	10/29/2018	2:55 AM	0.00	0.01	0.88	26.28	0.01	0.00	0.03	72.62	0.09	0.00	0.03	0.00	0.01	0.01	0.01	0.01	0.02	0.669
File 3A-32H - Production CSG	452934	10/4/2018	10:40 AM	0.00	0.03	2.17	8.31	0.17	0.00	0.00	70.05	10.84	0.00	4.51	0.00	0.69	1.59	0.44	0.47	0.75	0.767
File 3A-32H - Surface CSG	452934	10/4/2018	10:40 AM	0.00	0.01	0.81	7.31	0.16	0.00	0.00	91.16	0.62	0.00	0.05	0.00	0.01	0.01	0.00	0.00	0.02	0.593
Geist 22-32 - Production CSG	266935	10/25/2018	1:00 AM	0.00	0.00	0.29	1.26	2.29	0.00	0.03	75.47	11.02	0.00	4.62	0.00	0.77	1.76	0.75	1.15	0.72	0.772
Geist A 1 - Production CSG	243676	10/25/2018	-	0.00	0.00	0.34	1.41	1.97	0.00	0.03	72.91	12.38	0.00	5.54	0.00	0.79	2.11	0.63	0.81	1.08	0.791
Geist A 1 - Surface CSG	243676	10/25/2018	11:30 AM	0.00	0.00	2.04	8.58	0.01	0.00	0.03	71.63	10.07	0.00	4.88	0.00	0.54	1.30	0.26	0.31	0.34	0.743
Haley 41-22 - Production CSG	277424	11/11/2018	1:25 AM	0.00	0.12	0.47	2.11	0.61	0.00	0.03	78.65	11.30	0.00	4.73	0.00	0.55	1.06	0.16	0.12	0.09	0.702
Haley 4-2-22 - Production CSG	301057	11/11/2018	11:25 AM	0.00	0.01	0.32	1.49	1.70	0.00	0.03	81.32	11.44	0.00	2.38	0.00	0.21	0.89	0.11	0.09	0.02	



PRODUCED GAS ISOTOPE ANALYSIS

Crestone Peak Resources Crestone Peak Resources Produced Gases, Colorado

Sample ID	Cylinder ID Number	COGCC ID	Sampling Date	Sampling Time	Tubing Pressure (psia)	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 %)
Anderson 4-2-32 - Production CSG		420311	11/15/2018	8:00 AM			84.06	10.89	3.57	0.36	0.73	0.12	0.12	0.13
Anderson 4-2-32 - Surface CSG		420311	11/15/2018	8:05 AM			83.03	9.67	5.05	0.63	1.24	0.00	0.21	0.17
Aristocrat 4-0-3 - Production CSG		421915	11/11/2019	9:30 AM			79.19	12.27	4.79	0.87	1.75	0.55	0.48	0.11
Aristocrat 4-0-3 - Surface CSG		421915	11/11/2019	9:30 AM			81.32	11.37	4.91	0.68	1.09	0.28	0.17	0.18
Bell 34-26 - Production CSG		256506	10/19/2018	1:30 AM			71.44	16.14	6.66	1.37	2.39	1.04	0.70	0.25
Cosslett 32-22 - Production CSG		420875	11/11/2018	9:00 AM			77.97	12.64	5.62	0.80	1.86	0.42	0.44	0.24
Cosslett 32-22 - Surface CSG		420875	11/11/2018	9:00 AM			84.35	9.59	4.27	0.44	0.86	0.17	0.17	0.15
Cosslett 4-0-22 - Production CSG		420763	11/11/2018	8:00 AM			79.01	12.51	5.40	0.70	1.53	0.31	0.30	0.24
Cosslett 4-0-22 - Surface CSG		420763	11/11/2018	8:00 AM			84.54	8.11	4.88	0.71	1.25	0.29	0.25	0.17
Cosslett 6-4-22 - Production CSG		420884	11/11/2018	10:30 AM			76.73	12.87	5.91	0.88	2.14	0.50	0.55	0.42
Cosslett 6-4-22 - Surface CSG		420884	11/11/2018	10:30 AM			81.73	10.14	5.10	0.65	1.47	0.32	0.33	0.27
Cosslett B1X - Production CSG		244835	12/21/2018	-			77.92	13.51	5.94	0.80	1.55	0.17	0.09	0.02
Cosslett B1X - Surface CSG		244835	12/21/2018	-			82.73	9.43	4.86	0.65	1.40	0.32	0.33	0.28
Davis 10-9H - Production CSG		454502	1/21/2019	2:30 AM			79.97	12.81	4.64	0.60	1.26	0.26	0.27	0.19
Davis 10-9H - Surface CSG		454502	1/21/2019	2:30 AM			96.15	3.69	0.15	0.00	0.00	0.00	0.00	0.01
Davis 1F-9H - Production CSG		454371	1/21/2019	3:30 AM			80.91	7.89	2.69	0.42	1.13	0.79	1.28	4.88
Davis 1F-9H - Surface CSG		454371	1/21/2019	3:30 AM			84.35	10.47	3.04	0.38	1.00	0.22	0.22	0.13
Davis 1G-9H - Production CSG		454358	1/21/2019	4:00 AM			78.65	13.74	4.87	0.59	1.27	0.26	0.27	0.34
Davis 1G-9H - Surface CSG		454358	1/21/2019	4:00 AM			98.17	1.01	0.22	0.03	0.08	0.05	0.08	0.36
Davis 1H-9H - Production CSG		454363	1/23/2019	9:30 AM			82.41	12.66	3.36	0.34	0.84	0.14	0.14	0.12
Davis 1H-9H - Surface CSG		454363	1/23/2019	9:30 AM			97.78	1.43	0.36	0.04	0.09	0.03	0.05	0.21
Davis 1I-9H - Production CSG		454852	1/23/2019	10:00 AM			79.94	13.29	4.83	0.52	1.05	0.15	0.14	0.07
Davis 1I-9H - Surface CSG		454852	1/23/2019	10:00 AM			91.16	7.44	1.28	0.07	0.03	0.00	0.00	0.02
Davis 1J-9H - Production CSG		454359	1/23/2019	10:30 AM			78.77	13.15	4.92	0.68	1.44	0.37	0.33	0.34
Davis 1J-9H - Surface CSG		454359	1/23/2019	10:30 AM			84.79	10.91	3.37	0.35	0.49	0.06	0.02	0.01
Davis 1K-9H - Production CSG		454368	1/23/2019	11:00 AM			82.50	15.46	4.24	0.15	0.36	0.08	0.08	0.08
Davis 1K-9H - Surface CSG		454368	1/23/2019	11:00 AM			82.72	15.40	4.16	0.14	0.36	0.08	0.08	0.06
Davis 1L-9H - Production CSG		454687	1/23/2019	11:30 AM			83.12	15.45	0.88	0.11	0.26	0.06	0.06	0.05
Davis 1L-9H - Surface CSG		454687	1/23/2019	11:30 AM			86.01	11.19	2.64	0.11	0.04	0.00	0.00	0.01
Davis 1M-9H - Production CSG		454370	1/23/2019	12:00 PM			77.36	13.65	5.50	0.77	1.62	0.38	0.35	0.35
Davis 1M-9H - Surface CSG		454370	1/23/2019	12:00 PM			84.93	16.87	9.33	1.43	3.25	1.00	1.08	2.11
Davis 1N-9H - Production CSG		454357	1/23/2019	12:30 PM			78.44	12.81	5.08	0.66	1.50	0.38	0.46	0.67
Davis 1N-9H - Surface CSG		454357	1/23/2019	12:30 PM			73.19	0.45	1.42	1.09	4.38	3.48	4.43	11.56
Davis 1O-9H - Production CSG		454355	1/23/2019	1:00 AM			81.08	12.50	4.38	0.48	0.97	0.18	0.19	0.23
Davis 1O-9H - Surface CSG		454355	1/23/2019	1:00 AM			98.69	0.24	0.13	0.03	0.10	0.06	0.09	0.65
Davis 1Q-9H - Production CSG		454362	1/23/2019	1:30 AM			82.13	12.08	3.87	0.40	0.86	0.16	0.18	0.32
Davis 1Q-9H - Surface CSG		454362	1/23/2019	1:30 AM			78.58	13.63	5.77	0.61	1.11	0.13	0.07	0.09
Davis 1R-9H - Production CSG		454366	1/23/2019	2:00 AM			79.17	13.46	4.69	0.58	1.15	0.29	0.27	0.38
Davis 1R-9H - Surface CSG		454366	1/23/2019	2:00 AM			97.06	2.78	0.12	0.00	0.01	0.00	0.00	0.02
Davis 1T-9H - Production CSG		454367	1/23/2019	2:00 AM			79.67	12.32	4.71	0.63	1.46	0.37	0.42	0.42
Davis 1T-9H - Surface CSG		454367	1/23/2019	2:00 AM			98.79	1.06	0.05	0.01	0.02	0.01	0.02	0.04
Dier 33-8 - Production CSG		256299	1/21/2019	12:16 PM			77.03	14.73	6.98	0.91	0.00	0.25	0.10	0.00
Dier 33-8 - Surface CSG		256299	1/21/2019	12:16 PM			81.22	11.31	4.66	0.55	1.41	0.29	0.33	0.23
Elmqvist 21-23 - Production CSG		276477	10/30/2018	8:45 AM			77.79	13.34	5.83	0.76	1.85	0.25	0.17	0.00
Elmqvist 4-4-23 - Production CSG		418698	10/29/2018	3:03 AM			75.21	13.50	6.38	0.91	2.42	0.66	0.80	0.12
Elmqvist 4-4-23 - Surface CSG		418698	10/29/2018	2:55 AM			99.75	0.12	0.05	0.01	0.02	0.01	0.01	0.03
File 3A-32H - Production CSG		452934	10/4/2018	10:40 AM			78.41	12.13	5.04	0.77	1.78	0.49	0.53	0.84
File 3A-32H - Surface CSG		452934	10/4/2018	10:40 AM			99.23	0.68	0.05	0.01	0.01	0.00	0.00	0.02
Geist 22-32 - Production CSG		266935	10/25/2018	1:00 AM			78.50	11.46	4.81	0.80	1.83	0.66	0.75	1.19
Geist A 1 - Production CSG		243676	10/25/2018	11:30 AM			75.75	12.86	5.76	0.82	2.20	0.65	0.84	1.12
Geist A 1 - Surface CSG		243676	10/25/2018	11:30 AM			80.18	11.27	5.46	0.60	1.46	0.30	0.34	0.38
Haley 41-22 - Production CSG		277424	11/11/2018	1:25 AM			81.37	11.69	4.89	0.57	1.10	0.16	0.13	0.09
Haley 4-2-22 - Production CSG		301057	11/11/2018	11:25 AM			84.31	11.86	2.46	0.22	0.91	0.12	0.09	0.02
Haley 4-2-22 - Surface CSG		301057	11/11/2018	11:20 AM			84.98	8.29	4.26	0.94	1.03	0.25	0.16	0.13
Haley 8-4-22 - Production CSG		301056	11/11/2018	11:30 AM			80.66	12.07	4.64	0.55	1.27	0.26	0.30	0.26
Haley 8-4-22 - Surface CSG		301056	11/11/2018	11:30 AM			84.25	6.26	5.02	1.52	1.65	0.47	0.35	0.47
Herron 1 - Production CSG		241069	10/11/2018	8:40 AM			75.51	14.46	6.95	0.80	1.71	0.24	0.23	0.10
Herron 1 - Surface CSG		241069	9/13/2018	1:00 AM			82.88	11.25	3.97	0.41	0.87	0.17	0.20	0.24
Herron 1B-33H - Production CSG		457034	12/21/2018	12:00 PM			90.48	7.26	2.10	0.10	0.05	0.00	0.00	0.01
Herron 1B-33H - Surface CSG		457034	12/21/2018	9:00 AM			93.15	5.73	1.04	0.04	0.02	0.00	0.00	0.01
Herron 1C-33H - Surface CSG		457039	1/21/2019	9:00 AM			99.24	0.67	0.05	0.00	0.01	0.00	0.00	0.01
Herron 1D-33H - Surface CSG		457036	1/21/2019	9:00 AM			95.42	4.08	0.48	0.02	0.01	0.00	0.00	0.00
Herron 1E-33H - Surface CSG		457033	1/21/2019	9:30 AM			90.94	6.01	2.09	0.23	0.45	0.09	0.09	0.11
Herron 1F-33H - Surface CSG		457035	1/21/2019	12:00 PM			96.05	3.62	0.31	0.01	0.00	0.00	0.00	0.01
Herron 1G-33H - Surface CSG		457037	1/21/2019	10:30 AM			99.57	7.51	1.66	0.06	0.06	0.01	0.01	0.01
Herron 1H-33H - Surface CSG		457038	1/21/2019	12:00 PM			88.06	8.47	1.91	0.24	0.36	0.08	0.14	0.74
Herron 1I-33H - Surface CSG		457038	1/21/2019	11:30 AM			85.82	9.86	3.07	0.29	0.59	0.10	0.11	0.16
Herron 1J-33H - Surface CSG		457040	1/21/2019	9:30 AM			85.23	10.07	3.31	0.35	0.67	0.10	0.13	0.14
Herron 31-33 - Surface CSG		265302	1/22/2019	-			81.72	11.32	4.58	0.46	1.18	0.29	0.23	0.22
Herron 42-33 - Production CSG		260651	9/13/2018	8:45 AM			78.33	13.06	5.67	0.71	1.66	0.34	0.00	0.21
Herron 42-33 - Surface CSG		260651	9/13/2018	9:45 AM			84.64	8.44	4.62	0.54	1.11	0.22	0.22	0.22
Hwy 52 4B-32H - Production CSG		434579	12/4/2018	9:30 AM			84.41	10.44	3.51	0.38	0.84	0.15	0.15	0.11
Hwy 52 4B-32H - Surface CSG		434579	12/4/2018	9:35 AM			83.21	10.84	3.83	0.44	0.99	0.22	0.25	0.22

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	Tubing Pressure (psia)	Casing Pressure (psia)	BTU Content		Calculated Ratios			
							Total Gas (BTU/lb)	Hydrocar. Gas (BTU/lb)	Total HC Gas (ppm by mole)	Wetness (C2 - nC5) / (C1 - nC5)	C1/C2 Ratio (mole/mole)	iC4/nC4 Ratio (mole/mole)
Anderson 4-2-32 - Production CSG		420311	11/15/2018	8:00 AM			1,160	1,183	980,433	15.82	8	0.49
Anderson 4-2-32 - Surface CSG		420311	11/15/2018	8:05 AM			1,187	1,214	977,763	16.84	9	0.51
Anistocrat 4-0-3 - Production CSG		421915	1/11/2019	9:30 AM			1,213	1,269	955,624	20.72	6	0.50
Anistocrat 4-0-3 - Surface CSG		421915	1/11/2019	9:30 AM			1,213	1,230	985,250	18.53	7	0.63
Bell 34-26 - Production CSG		256596	10/19/2018	1:30 AM			1,256	1,379	910,586	28.37	4	0.57
Coslett 32-22 - Production CSG		420875	11/1/2018	9:00 AM			1,247	1,285	970,087	21.84	6	0.43
Coslett 32-22 - Surface CSG		420875	11/1/2018	9:00 AM			1,163	1,192	975,945	15.52	9	0.51
Coslett 4-0-22 - Production CSG		420763	11/1/2018	8:00 AM			1,220	1,264	965,685	20.80	6	0.46
Coslett 4-0-22 - Surface CSG		420763	11/1/2018	8:00 AM			1,159	1,209	968,724	15.32	10	0.57
Coslett 6-4-22 - Production CSG		420884	11/1/2018	10:30 AM			1,250	1,312	952,524	22.95	6	0.41
Coslett 6-4-22 - Surface CSG		420884	11/1/2018	10:30 AM			1,212	1,241	976,681	18.06	8	0.44
Coslett B1X - Production CSG		244835	12/21/2018	-			1,220	1,263	965,752	22.07	6	0.52
Coslett B1X - Surface CSG		244835	12/21/2018	-			1,201	1,231	975,323	17.04	9	0.46
Davis 1D-9H - Production CSG		454502	1/21/2019	2:30 AM			1,217	1,242	979,815	19.87	6	0.47
Davis 1D-9H - Surface CSG		454502	1/21/2019	2:30 AM			508	1,041	488,617	3.85	26	1.23
Davis 1F-9H - Production CSG		454371	1/21/2019	3:30 AM			8	1,390	5,715	14.94	10	0.38
Davis 1F-9H - Surface CSG		454371	1/21/2019	3:30 AM			1,160	1,186	978,060	15.54	8	0.38
Davis 1G-9H - Production CSG		454358	1/21/2019	4:00 AM			1,228	1,258	975,945	21.08	6	0.47
Davis 1G-9H - Surface CSG		454358	1/21/2019	4:00 AM			61	1,041	58,923	1.47	97	0.37
Davis 1H-9H - Production CSG		454363	1/23/2019	9:30 AM			1,155	1,196	965,505	17.49	7	0.40
Davis 1H-9H - Surface CSG		454363	1/23/2019	9:30 AM			41	1,040	38,972	2.02	68	0.51
Davis 1I-9H - Production CSG		454852	1/23/2019	10:00 AM			1,204	1,230	978,714	20.00	6	0.50
Davis 1I-9H - Surface CSG		454852	1/23/2019	10:00 AM			953	1,089	875,546	8.82	12	2.39
Davis 1J-9H - Production CSG		454359	1/23/2019	10:30 AM			1,239	1,265	979,424	20.95	6	0.48
Davis 1J-9H - Surface CSG		454359	1/23/2019	10:30 AM			1,134	1,165	972,758	15.20	8	0.72
Davis 1K-9H - Production CSG		454368	1/23/2019	11:00 AM			1,119	1,167	955,071	17.43	5	0.46
Davis 1K-9H - Surface CSG		454368	1/23/2019	11:00 AM			1,081	1,163	929,254	17.23	5	0.38
Davis 1L-9H - Production CSG		454687	1/23/2019	11:30 AM			1,086	1,155	940,799	16.83	5	0.40
Davis 1L-9H - Surface CSG		454687	1/23/2019	11:30 AM			979	1,139	859,462	13.99	8	2.45
Davis 1M-9H - Production CSG		454370	1/23/2019	12:00 PM			1,268	1,286	986,264	22.36	6	0.48
Davis 1M-9H - Surface CSG		454370	1/23/2019	12:00 PM			5	1,525	3,068	33.66	4	0.44
Davis 1N-9H - Production CSG		454357	1/23/2019	12:30 PM			1,249	1,283	974,176	21.03	6	0.44
Davis 1N-9H - Surface CSG		454357	1/23/2019	12:30 PM			121	1,828	66,423	17.24	162	0.25
Davis 1O-9H - Production CSG		454355	1/23/2019	1:00 AM			1,196	1,223	978,204	18.74	6	0.49
Davis 1O-9H - Surface CSG		454355	1/23/2019	1:00 AM			25	1,046	23,456	0.66	408	0.30
Davis 1Q-9H - Production CSG		454362	1/23/2019	1:30 AM			1,187	1,211	980,705	17.61	7	0.47
Davis 1Q-9H - Surface CSG		454362	1/23/2019	1:30 AM			1,188	1,249	951,158	21.35	6	0.55
Davis 1R-9H - Production CSG		454356	1/23/2019	2:00 AM			1,224	1,253	976,757	20.53	6	0.51
Davis 1R-9H - Surface CSG		454356	1/23/2019	2:00 AM			780	1,034	753,807	2.92	35	0.67
Davis 1T-9H - Production CSG		454367	1/23/2019	2:00 AM			1,238	1,261	981,771	19.99	6	0.43
Davis 1T-9H - Surface CSG		454367	1/23/2019	2:00 AM			118	1,022	115,269	1.17	93	0.37
Dier 33-8 - Production CSG		256299	1/21/2019	12:16 PM			1,215	1,258	965,620	22.96	5	#DIV/0!
Dier 33-8 - Surface CSG		256299	1/21/2019	-			1,211	1,237	978,759	18.60	7	0.39
Elmqvist 21-23 - Production CSG		276477	10/30/2018	8:45 AM			1,224	1,271	963,174	22.21	6	0.41
Elmqvist 4-4-23 - Production CSG		418698	10/29/2018	3:03 AM			1,262	1,332	947,756	24.70	6	0.38
Elmqvist 4-4-23 - Surface CSG		418698	10/29/2018	2:55 AM			738	1,014	727,992	0.22	828	0.63
File 3A-32H - Production CSG		452934	10/4/2018	10:40 AM			1,159	1,297	893,329	20.92	6	0.43
File 3A-32H - Surface CSG		452934	10/4/2018	10:40 AM			934	1,077	918,636	0.75	147	0.54
Geist 22-32 - Production CSG		266935	10/25/2018	1:00 AM			1,265	1,315	961,350	20.55	7	0.44
Geist A 1 - Production CSG		243676	10/25/2018	-			1,298	1,349	962,510	23.40	6	0.37
Geist A 1 - Surface CSG		243676	10/25/2018	11:30 AM			1,124	1,258	893,356	19.51	7	0.41
Haley 41-22 - Production CSG		277424	11/1/2018	1:25 AM			1,181	1,222	966,599	18.56	7	0.52
Haley 4-2-22 - Production CSG		301057	11/1/2018	11:25 AM			1,128	1,170	964,509	15.67	7	0.24
Haley 4-2-22 - Surface CSG		301057	11/1/2018	11:20 AM			1,136	1,199	947,954	14.91	10	0.92
Haley 8-4-22 - Production CSG		301056	11/1/2018	11:30 AM			1,207	1,239	974,523	19.13	7	0.43
Haley 8-4-22 - Surface CSG		301056	11/1/2018	11:30 AM			582	1,247	467,023	15.35	13	0.92
Herron 1 - Production CSG		241069	10/1/2018	8:40 AM			1,015	1,299	781,419	24.41	5	0.47
Herron 1 - Surface CSG		241069	9/13/2018	1:00 AM			1,086	1,204	901,780	16.92	7	0.47
Herron 1B-33H - Production CSG		457034	1/21/2019	12:00 PM			614	1,101	557,782	8.51	12	2.01
Herron 1B-33H - Surface CSG		457034	1/21/2019	9:00 AM			891	1,071	845,155	8.94	16	2.13
Herron 1C-33H - Surface CSG		457039	1/21/2019	9:00 AM			141	1,017	139,004	0.74	147	0.43
Herron 1D-33H - Surface CSG		457036	1/21/2019	9:00 AM			330	1,049	314,343	4.58	23	2.93
Herron 1E-33H - Surface CSG		457033	1/21/2019	9:30 AM			8	1,112	7,442	8.96	15	0.52
Herron 1F-33H - Surface CSG		457035	1/21/2019	12:00 PM			90	1,043	86,190	3.94	27	2.79
Herron 1G-33H - Surface CSG		457037	1/21/2019	10:30 AM			161	1,097	146,576	9.42	12	1.29
Herron 1H-33H - Surface CSG		457038	1/21/2019	12:00 PM			1	1,151	914	11.28	10	0.67
Herron 1I-33H - Surface CSG		457038	1/21/2019	11:30 AM			24	1,163	20,890	14.05	9	0.49
Herron 1J-33H - Surface CSG		457040	1/21/2019	9:30 AM			5	1,171	4,658	14.65	8	0.51
Herron 31-33 - Surface CSG		266302	1/22/2019	-			1,113	1,226	908,261	18.10	7	0.39
Herron 42-33 - Production CSG		260651	9/13/2018	8:45 AM			1,137	1,266	897,847	21.50	6	0.43
Herron 42-33 - Surface CSG		260651	9/13/2018	8:45 AM			1,072	1,202	892,119	15.18	10	0.46
Hwy 52 4B-32H - Production CSG		434579	12/4/2018	9:30 AM			1,148	1,183	970,209	15.49	8	0.46
Hwy 52 4B-32H - Surface CSG		434579	12/4/2018	9:35 AM			1,162	1,205	964,932	16.61	8	0.44