ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #: 727397 Job #: 42266 IS-94649 Co. Job#:
Sample Name: Barb LTD 30-10 / Production Casing Co. Lab#:
Company: Crestone Peak Resources
API/Well:
Container: IsoTube®
Field/Site Name: Bradenhead Testing
Location: 16191454
Formation:
Sampling Point: 251127
Date Sampled: 6/18/2019 Date Received: 7/23/2019 Date Reported: 8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0091			
Hydrogen	nd			
Argon	0.0133			
Oxygen	0.27			
Nitrogen	1.03			
Carbon Dioxide	1.61	2.7		
Methane	76.63	-48.4	-247	
Ethane	12.16	-31.8		
Ethylene	nd			
Propane	5.32	-28.5		
Propylene	nd			
Iso-butane	0.686	-31.4		
N-butane	1.60	-27.4		
Iso-pentane	0.352	-28.4		
N-pentane	0.317	-27.2		
Hexanes +	0.0009			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1231
Specific gravity, calculated: 0.732

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	727398	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Barb LTD 30-10 / Surface Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16191454				
Formation:					
Sampling Point:	251127				
Date Sampled:	6/18/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0404			
Hydrogen	nd			
Argon	0.208			
Oxygen	4.78			
Nitrogen	18.97			
Carbon Dioxide	0.023			
Methane	65.34	-53.9	-227	
Ethane	5.39	-32.5		
Ethylene	nd			
Propane	3.43	-29.7		
Propylene	nd			
Iso-butane	0.501	-32.0		
N-butane	0.863	-28.3		
Iso-pentane	0.196	-28.4		
N-pentane	0.168	-27.6		
Hexanes +	0.0883			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 909

Specific gravity, calculated: 0.749

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
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ANALYSIS REPORT

Lab #: 727399 Job #: 42266 IS-94649 Co. Job#:
Sample Name: Wiggett 4-0-13 / Production Cading Co. Lab#:
Company: Crestone Peak Resources
API/Well:
Container: IsoTube®
Field/Site Name: Bradenhead Testing
Location: 16192241
Formation:
Sampling Point: 293670
Date Sampled: 6/18/2019 Date Received: 7/23/2019 Date Reported: 8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0142			
Hydrogen	0.0642			
Argon	0.0145			
Oxygen	0.29			
Nitrogen	1.25			
Carbon Dioxide	1.60	2.4		
Methane	86.24	-47.0	-233	
Ethane	8.70	-30.8		
Ethylene	0.0004			
Propane	0.913	-28.2		
Propylene	nd			
Iso-butane	0.0950	-31.7		
N-butane	0.619	-27.4		
Iso-pentane	0.121	-28.0		
N-pentane	0.0691	-26.7		
Hexanes +	0.0097			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1084
Specific gravity, calculated: 0.641

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
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ANALYSIS REPORT

Lab #:	727400	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Wiggett 4-0-13 / Surface Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16192241				
Formation:					
Sampling Point:	293670				
Date Sampled:	6/18/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	na			
Helium	na			
Hydrogen	na			
Argon	na			
Oxygen	na			
Nitrogen	na			
Carbon Dioxide	na			
Methane	na			
Ethane	na			
Ethylene	na			
Propane	na			
Propylene	na			
Iso-butane	na			
N-butane	na			
Iso-pentane	na			
N-pentane	na			
Hexanes +	na			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 0

Specific gravity, calculated: 0

Remarks: Leaking

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
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ANALYSIS REPORT

Lab #: 727401 Job #: 42266 IS-94649 Co. Job#:
Sample Name: Costigan 6-8-20 / Production Casing Co. Lab#:
Company: Crestone Peak Resources
API/Well:
Container: IsoTube®
Field/Site Name: Bradenhead Testing
Location: 16192173
Formation:
Sampling Point: 301900
Date Sampled: 6/24/2019 Date Received: 7/23/2019 Date Reported: 8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0087			
Hydrogen	0.0279			
Argon	0.0142			
Oxygen	0.27			
Nitrogen	1.11			
Carbon Dioxide	1.45	1.6		
Methane	75.82	-47.8	-240	
Ethane	12.68	-31.6		
Ethylene	0.0007			
Propane	5.69	-28.2		
Propylene	nd			
Iso-butane	0.784	-31.0		
N-butane	1.66	-27.3		
Iso-pentane	0.260	-27.8		
N-pentane	0.220	-26.9		
Hexanes +	0.0081			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1240
Specific gravity, calculated: 0.736

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	727402	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Costigan 6-8-20 / Surface Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16192173				
Formation:					
Sampling Point:	301900				
Date Sampled:	6/24/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0155			
Hydrogen	nd			
Argon	0.0142			
Oxygen	0.29			
Nitrogen	1.22			
Carbon Dioxide	0.010			
Methane	79.96	-48.7	-242	
Ethane	10.89	-32.4		
Ethylene	0.0001			
Propane	4.87	-28.4		
Propylene	nd			
Iso-butane	0.643	-31.9		
N-butane	1.32	-27.9		
Iso-pentane	0.329	-28.5		
N-pentane	0.270	-28.4		
Hexanes +	0.170			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1225

Specific gravity, calculated: 0.705

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
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ANALYSIS REPORT

Lab #: 727403 Job #: 42266 IS-94649 Co. Job#:
Sample Name: Costigan 34-20 / Production Casing Co. Lab#:
Company: Crestone Peak Resources
API/Well:
Container: IsoTube®
Field/Site Name: Bradenhead Testing
Location: 16192176
Formation:
Sampling Point: 301573
Date Sampled: 6/24/2019 Date Received: 7/23/2019 Date Reported: 8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0115			
Hydrogen	0.0189			
Argon	0.0168			
Oxygen	0.32			
Nitrogen	1.37			
Carbon Dioxide	1.41	1.3		
Methane	76.99	-47.3	-238	
Ethane	10.97	-31.4		
Ethylene	0.0007			
Propane	5.05	-28.1		
Propylene	nd			
Iso-butane	0.836	-31.4		
N-butane	1.81	-28.4		
Iso-pentane	0.497	-28.6		
N-pentane	0.475	-27.0		
Hexanes +	0.222			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1241
Specific gravity, calculated: 0.740

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	727404	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Costigan 34-20 / Surface Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16192176				
Formation:					
Sampling Point:	301573				
Date Sampled:	6/24/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0164			
Hydrogen	nd			
Argon	0.0138			
Oxygen	0.28			
Nitrogen	1.38			
Carbon Dioxide	0.009			
Methane	81.41	-49.6	-246	
Ethane	9.97	-33.9		
Ethylene	0.0001			
Propane	4.81	-29.5		
Propylene	nd			
Iso-butane	0.604	-31.9		
N-butane	1.05	-28.1		
Iso-pentane	0.220	-28.5		
N-pentane	0.157	-28.9		
Hexanes +	0.0820			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1199

Specific gravity, calculated: 0.690

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
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ANALYSIS REPORT

Lab #: 727405 Job #: 42266 IS-94649 Co. Job#:
Sample Name: Wandell 6-8-7 / Production Casing Co. Lab#:
Company: Crestone Peak Resources
API/Well:
Container: IsoTube®
Field/Site Name: Bradenhead Testing
Location: 16192239
Formation:
Sampling Point: 415307
Date Sampled: 6/18/2019 Date Received: 7/23/2019 Date Reported: 8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0185			
Hydrogen	3.35			
Argon	0.0091			
Oxygen	0.16			
Nitrogen	0.82			
Carbon Dioxide	0.88	-0.8		
Methane	73.15	-50.4	-256	
Ethane	11.95	-33.9		
Ethylene	0.0003			
Propane	6.12	-30.1		
Propylene	nd			
Iso-butane	0.758	-32.7		
N-butane	1.93	-28.5		
Iso-pentane	0.374	-28.2		
N-pentane	0.377	-27.8		
Hexanes +	0.108			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1245
Specific gravity, calculated: 0.724

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	727406	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Wandell 6-8-7 / Surface Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16192239				
Formation:					
Sampling Point:	415307				
Date Sampled:	6/18/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.237			
Hydrogen	nd			
Argon	0.175			
Oxygen	2.73			
Nitrogen	66.48			
Carbon Dioxide	0.017			
Methane	26.42	-66.7	-252	
Ethane	0.552	-34.7		
Ethylene	0.0006			
Propane	1.49	-30.2		
Propylene	0.0003			
Iso-butane	0.826	-31.8		
N-butane	0.594	-30.0		
Iso-pentane	0.263	-28.3		
N-pentane	0.126	-27.7		
Hexanes +	0.0843			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 381

Specific gravity, calculated: 0.892

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	727407	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Herbers 31-20 / Production Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16192256				
Formation:					
Sampling Point:	251890				
Date Sampled:	6/20/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0132			
Hydrogen	1.50			
Argon	0.0107			
Oxygen	0.21			
Nitrogen	0.86			
Carbon Dioxide	1.40	1.0		
Methane	66.83	-54.3	-260	
Ethane	11.63	-35.0		
Ethylene	0.0003			
Propane	7.44	-30.1		
Propylene	nd			
Iso-butane	1.49	-32.8		
N-butane	4.73	-28.3		
Iso-pentane	1.64	-28.0		
N-pentane	2.01	-27.2		
Hexanes +	0.239			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1444

Specific gravity, calculated: 0.860

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
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ANALYSIS REPORT

Lab #:	727408	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Cosslett 6-4-22 / Production Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16191878				
Formation:					
Sampling Point:	420884				
Date Sampled:	6/07/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	nd			
Hydrogen	nd			
Argon	0.878			
Oxygen	20.13			
Nitrogen	78.94			
Carbon Dioxide	0.049			
Methane	0.0002			
Ethane	nd			
Ethylene	nd			
Propane	nd			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 0

Specific gravity, calculated: 0.999

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
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ANALYSIS REPORT

Lab #:	727409	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Cosslett 6-4-22 / Surface Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16191878				
Formation:					
Sampling Point:	420884				
Date Sampled:	6/07/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0278			
Hydrogen	0.0164			
Argon	0.0151			
Oxygen	0.27			
Nitrogen	1.52			
Carbon Dioxide	0.011			
Methane	81.14	-50.4	-246	
Ethane	9.90	-33.0		
Ethylene	0.0001			
Propane	4.81	-29.2		
Propylene	nd			
Iso-butane	0.566	-31.7		
N-butane	1.20	-27.9		
Iso-pentane	0.231	-28.7		
N-pentane	0.214	-28.2		
Hexanes +	0.0814			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1201

Specific gravity, calculated: 0.693

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #: 727410 Job #: 42266 IS-94649 Co. Job#:
Sample Name: Cosslett 1D-22H / Production Casing Co. Lab#:
Company: Crestone Peak Resources
API/Well:
Container: IsoTube®
Field/Site Name: Bradenhead Testing
Location: 16191459
Formation:
Sampling Point: 456854
Date Sampled: 7/10/2019 Date Received: 7/23/2019 Date Reported: 8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0083			
Hydrogen	0.271			
Argon	0.0101			
Oxygen	0.15			
Nitrogen	0.92			
Carbon Dioxide	0.13	-7.3		
Methane	77.04	-48.4	-243	
Ethane	12.20	-31.7		
Ethylene	0.0002			
Propane	5.43	-28.6		
Propylene	nd			
Iso-butane	0.778	-32.1		
N-butane	1.78	-27.9		
Iso-pentane	0.436	-28.7		
N-pentane	0.469	-27.5		
Hexanes +	0.379			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1276
Specific gravity, calculated: 0.734

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #: 727411 Job #: 42266 IS-94649 Co. Job#:
Sample Name: Cosslett 1D-22H / Surface Casing Co. Lab#:
Company: Crestone Peak Resources
API/Well:
Container: IsoTube®
Field/Site Name: Bradenhead Testing
Location: 16191459
Formation:
Sampling Point: 456854
Date Sampled: 7/10/2019 Date Received: 7/23/2019 Date Reported: 8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.184			
Hydrogen	0.0342			
Argon	0.197			
Oxygen	0.27			
Nitrogen	16.83			
Carbon Dioxide	0.008			
Methane	82.28	-46.7	-231	
Ethane	0.0576			
Ethylene	0.0004			
Propane	0.0143			
Propylene	0.0002			
Iso-butane	0.0031			
N-butane	0.0098			
Iso-pentane	0.0134	-28.5		
N-pentane	0.0214	-27.5		
Hexanes +	0.0768			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 841
Specific gravity, calculated: 0.629

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	727412	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Cosslett 1E-22H / Production Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16191460				
Formation:					
Sampling Point:	456855				
Date Sampled:	7/10/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0085			
Hydrogen	0.285			
Argon	0.0124			
Oxygen	0.13			
Nitrogen	1.04			
Carbon Dioxide	0.053	-11.3		
Methane	78.67	-48.5	-245	
Ethane	12.05	-31.6		
Ethylene	0.0002			
Propane	4.93	-28.4		
Propylene	nd			
Iso-butane	0.642	-31.7		
N-butane	1.35	-27.3		
Iso-pentane	0.283	-28.4		
N-pentane	0.290	-27.4		
Hexanes +	0.257			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1239

Specific gravity, calculated: 0.711

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	727413	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Cosslett 1E-22H / Surface Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16191460				
Formation:					
Sampling Point:	456855				
Date Sampled:	7/10/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0499			
Hydrogen	nd			
Argon	0.578			
Oxygen	12.40			
Nitrogen	49.65			
Carbon Dioxide	0.050	-14.0		
Methane	36.85	-49.4	-233	
Ethane	0.0583			
Ethylene	0.0004			
Propane	0.0296	-28.3		
Propylene	nd			
Iso-butane	0.0102	-26.0		
N-butane	0.0379	-29.3		
Iso-pentane	0.0319	-28.2		
N-pentane	0.0507	-27.8		
Hexanes +	0.200			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 389

Specific gravity, calculated: 0.840

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #: 727414 Job #: 42266 IS-94649 Co. Job#:
Sample Name: Cosslett 1G-22H / Production Casing Co. Lab#:
Company: Crestone Peak Resources
API/Well:
Container: IsoTube®
Field/Site Name: Bradenhead Testing
Location: 16191462
Formation:
Sampling Point: 456850
Date Sampled: 7/10/2019 Date Received: 7/23/2019 Date Reported: 8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0075			
Hydrogen	0.145			
Argon	0.0134			
Oxygen	0.16			
Nitrogen	1.27			
Carbon Dioxide	0.097	-7.4		
Methane	76.80	-48.7	-247	
Ethane	12.35	-31.7		
Ethylene	0.0004			
Propane	5.48	-28.4		
Propylene	0.0002			
Iso-butane	0.753	-31.6		
N-butane	1.71	-27.7		
Iso-pentane	0.402	-28.6		
N-pentane	0.440	-27.6		
Hexanes +	0.371			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1271
Specific gravity, calculated: 0.734

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	727415	Job #:	42266	IS-94649	Co. Job#:
Sample Name:	Cosslett 1G-22H / Surface Casing				Co. Lab#:
Company:	Crestone Peak Resources				
API/Well:					
Container:	IsoTube®				
Field/Site Name:	Bradenhead Testing				
Location:	16191462				
Formation:					
Sampling Point:	456850				
Date Sampled:	7/10/2019	Date Received:	7/23/2019	Date Reported:	8/27/2019

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{15}N$ ‰
Carbon Monoxide	nd			
Helium	0.0066			
Hydrogen	nd			
Argon	0.819			
Oxygen	18.99			
Nitrogen	71.31			
Carbon Dioxide	0.085	-12.1		
Methane	7.86	-49.3	-244	
Ethane	0.704	-33.7		
Ethylene	0.0001			
Propane	0.0944	-27.3		
Propylene	nd			
Iso-butane	0.0057	-31.5		
N-butane	0.0194	-27.4		
Iso-pentane	0.0171	-28.3		
N-pentane	0.0253	-27.8		
Hexanes +	0.0593			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 100

Specific gravity, calculated: 0.968

Remarks: Isotopes analyzed online via GC-C-IRMS and GC-P-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.