

Lab #: 844221 Job #: 52375 IS-65777 Co. Job#:
 Sample Name: CS-4 Co. Lab#:
 Company: University of North Dakota - Energy & Environmental Resea
 API/Well:
 Container: IsoBag
 Field/Site Name: CSND
 Location:
 Formation/Depth:
 Sampling Point:
 Date Sampled: 9/28/2022 13:00 Date Received: 10/04/2022 Date Reported: 10/27/2022

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	δD ‰	^{14}C conc. pMC	Tritium TU
Carbon Monoxide -----	nd				
Helium -----	nd				
Hydrogen -----	nd				
Argon -----	0.951				
Oxygen -----	17.04				
Nitrogen -----	80.17				
Carbon Dioxide -----	1.84	-15.73		49.0 \pm 0.2	
Methane -----	0.0003				
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: 1.005

Remarks:

Insufficient methane concentration for d13C, d14C and dD isotope analysis.

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. %.

Lab #: 844222 Job #: 52375 IS-65777 Co. Job#:
 Sample Name: CS-9 Co. Lab#:
 Company: University of North Dakota - Energy & Environmental Resea
 API/Well:
 Container: IsoBag
 Field/Site Name: CSND
 Location:
 Formation/Depth:
 Sampling Point:
 Date Sampled: 9/28/2022 13:45 Date Received: 10/04/2022 Date Reported: 10/27/2022

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	δD ‰	^{14}C conc. pMC	Tritium TU
Carbon Monoxide -----	nd				
Helium -----	nd				
Hydrogen -----	nd				
Argon -----	1.02				
Oxygen -----	1.28				
Nitrogen -----	87.14				
Carbon Dioxide -----	10.56	-18.02		8.7 ± 0.1	
Methane -----	0.0022				
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: 1.032

Remarks:

Insufficient methane concentration for d13C, d14C and dD isotope analysis.

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. %.

Lab #: 844223 Job #: 52375 IS-65777 Co. Job#:
 Sample Name: CS-15 Co. Lab#:
 Company: University of North Dakota - Energy & Environmental Resea
 API/Well:
 Container: IsoBag
 Field/Site Name: CSND
 Location:
 Formation/Depth:
 Sampling Point:
 Date Sampled: 9/28/2022 14:30 Date Received: 10/04/2022 Date Reported: 10/27/2022

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	δD ‰	^{14}C conc. pMC	Tritium TU
Carbon Monoxide -----	nd				
Helium -----	nd				
Hydrogen -----	nd				
Argon -----	1.02				
Oxygen -----	1.19				
Nitrogen -----	86.73				
Carbon Dioxide -----	11.06	-17.87		7.6 ± 0.1	
Methane -----	0.0023				
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: 1.034

Remarks:

Insufficient methane concentration for d13C, d14C and dD isotope analysis.

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. %.