

Lab #: 235497 Job #: 17407  
 Sample Name/Number: HW01  
 Company: TechLaw, Inc.  
 Date Sampled: 1/25/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	0.0747			
Hydrogen -----	nd			
Argon -----	0.683			
Oxygen -----	0.20			
Nitrogen -----	49.91			
Carbon Dioxide -----	0.005			
Methane -----	48.69	-36.80	-202.4	
Ethane -----	0.432	-31.58	-177	
Ethylene -----	nd			
Propane -----	0.0004			
Propylene -----	0.0001			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-65.1	-9.81

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 501 Specific gravity, calculated: 0.769

Remarks:

\*\* Ethane hydrogen isotopes obtained online via GC-C-IRMS. Added to the report on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235496 Job #: 17407  
 Sample Name/Number: HW02  
 Company: TechLaw, Inc.  
 Date Sampled: 1/25/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	0.0110			
Hydrogen -----	nd			
Argon -----	0.636			
Oxygen -----	1.12			
Nitrogen -----	41.09			
Carbon Dioxide -----	0.10			
Methane -----	56.36	-29.36	-160.5	
Ethane -----	0.683	-28.83	-169	
Ethylene -----	nd			
Propane -----	nd			
Propylene -----	0.0001			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-64.5	-9.76

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 583 Specific gravity, calculated: 0.739

Remarks:

\*\* Ethane hydrogen isotopes obtained online via GC-C-IRMS. Added to the report on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235488 Job #: 17407  
 Sample Name/Number: HW02z  
 Company: TechLaw, Inc.  
 Date Sampled: 1/25/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	0.0112			
Hydrogen -----	nd			
Argon -----	0.628			
Oxygen -----	0.80			
Nitrogen -----	40.72			
Carbon Dioxide -----	0.094			
Methane -----	57.06	-29.30	-160.6	
Ethane -----	0.687	-28.6	-166	
Ethylene -----	nd			
Propane -----	nd			
Propylene -----	0.0001			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-64.6	-9.66

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 590 Specific gravity, calculated: 0.736

Remarks:

\*\* Ethane isotopes obtained online via GC-C-IRMS. Added to the report on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235489 Job #: 17407  
 Sample Name/Number: HW04  
 Company: TechLaw, Inc.  
 Date Sampled: 1/24/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	1.50			
Oxygen -----	2.28			
Nitrogen -----	84.37			
Carbon Dioxide -----	2.01			
Methane -----	9.76	-24.98	-121.8	
Ethane -----	0.0796	-31.2	-187	
Ethylene -----	nd			
Propane -----	0.0004			
Propylene -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-63.2	-9.48

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 100 Specific gravity, calculated: 0.947

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.74

\*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

\*\* Ethane isotopes obtained online via GC-C-IRMS. Added to the report on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235490 Job #: 17407  
 Sample Name/Number: HW05  
 Company: TechLaw, Inc.  
 Date Sampled: 1/26/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	1.54			
Oxygen -----	4.82			
Nitrogen -----	84.97			
Carbon Dioxide -----	0.40			
Methane -----	8.24	-33.0	-162.9	
Ethane -----	0.0259			
Ethylene -----	nd			
Propane -----	nd			
Propylene -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-63.2	-9.36

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 84 Specific gravity, calculated: 0.948

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.68  
 \*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.  
 \*\* Methane carbon isotopes obtained online via GC-C-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235491 Job #: 17407  
 Sample Name/Number: HW06  
 Company: TechLaw, Inc.  
 Date Sampled: 1/26/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	0.0248			
Hydrogen -----	0.0222			
Argon -----	0.503			
Oxygen -----	1.04			
Nitrogen -----	32.03			
Carbon Dioxide -----	0.008			
Methane -----	65.62	-31.07	-169.0	
Ethane -----	0.746	-34.43	-195.0	
Ethylene -----	nd			
Propane -----	0.0068			
Propylene -----	0.0001			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-65.6	-9.85

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 678

Specific gravity, calculated: 0.700

Remarks:

\*\*Ethane isotope data added on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235492 Job #: 17407  
 Sample Name/Number: HW08a  
 Company: TechLaw, Inc.  
 Date Sampled: 1/25/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	0.746			
Oxygen -----	5.31			
Nitrogen -----	36.31			
Carbon Dioxide -----	3.22			
Methane -----	53.64	-36.58	-209.9	
Ethane -----	0.767	-35.9	-189	
Ethylene -----	nd			
Propane -----	0.0030			
Propylene -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-61.0	-9.20

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 557

Specific gravity, calculated: 0.774

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.67

\*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

\*\* Ethane isotopes obtained online via GC-C-IRMS. Added to the report on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235493 Job #: 17407  
 Sample Name/Number: HW12  
 Company: TechLaw, Inc.  
 Date Sampled: 1/26/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	0.0434			
Hydrogen -----	nd			
Argon -----	0.115			
Oxygen -----	0.16			
Nitrogen -----	4.54			
Carbon Dioxide -----	0.073			
Methane -----	94.06	-35.90	-196.7	
Ethane -----	0.987	-35.33	-204.0	
Ethylene -----	nd			
Propane -----	0.0221			
Propylene -----	0.0002			
Iso-butane -----	0.0006			
N-butane -----	0.0012			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-64.6	-9.60

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 972

Specific gravity, calculated: 0.580

Remarks:

\*\*Ethane isotope data added on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235498 Job #: 17407  
 Sample Name/Number: HW14  
 Company: TechLaw, Inc.  
 Date Sampled: 1/26/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	1.46			
Oxygen -----	2.70			
Nitrogen -----	72.02			
Carbon Dioxide -----	4.99			
Methane -----	18.74	-26.58	-140.3	
Ethane -----	0.0899	-26.6	-157	
Ethylene -----	nd			
Propane -----	nd			
Propylene -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-63.2	-9.54

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 191 Specific gravity, calculated: 0.927

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.74

\*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

\*\* Ethane isotopes obtained online via GC-C-IRMS. Added to the report on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235494 Job #: 17407  
 Sample Name/Number: HW17  
 Company: TechLaw, Inc.  
 Date Sampled: 1/27/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	1.49			
Oxygen -----	2.06			
Nitrogen -----	80.93			
Carbon Dioxide -----	0.43			
Methane -----	14.97	-31.54	-167.8	
Ethane -----	0.118	-32.9	-169	
Ethylene -----	nd			
Propane -----	0.0011			
Propylene -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-64.9	-9.63

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 154      Specific gravity, calculated: 0.917

**Remarks:**

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.72

\*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

\*\* Ethane isotopes obtained online via GC-C-IRMS. Added to the report on 4/26/2012.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235499 Job #: 17407  
 Sample Name/Number: HW19  
 Company: TechLaw, Inc.  
 Date Sampled: 1/23/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	1.63			
Oxygen -----	7.11			
Nitrogen -----	86.88			
Carbon Dioxide -----	4.38			
Methane -----	0.0011			
Ethane -----	nd			
Ethylene -----	nd			
Propane -----	nd			
Propylene -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-61.1	-9.13

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 0 Specific gravity, calculated: 1.008

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.73

\*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 235495 Job #: 17407  
 Sample Name/Number: HW24  
 Company: TechLaw, Inc.  
 Date Sampled: 1/27/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: A3TA  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 2/03/2012 Date Reported: 2/20/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	1.58			
Oxygen -----	1.29			
Nitrogen -----	94.00			
Carbon Dioxide -----	0.017			
Methane -----	3.11	-53.8	-165	
Ethane -----	nd			
Ethylene -----	nd			
Propane -----	nd			
Propylene -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-64.8	-9.70

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 31 Specific gravity, calculated: 0.963

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.65  
 \*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.  
 \*\* Methane isotopes obtained online via the GC-C-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

Lab #: 239878 Job #: 17692  
 Sample Name/Number: HW60  
 Company: TechLaw, Inc.  
 Date Sampled: 3/05/2012  
 Container: Dissolved Gas Bottle  
 Field/Site Name: Case# R33917  
 Location:  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 3/13/2012 Date Reported: 4/03/2012

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{18}\text{O}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	0.0233			
Hydrogen -----	nd			
Argon -----	0.516			
Oxygen -----	0.066			
Nitrogen -----	29.47			
Carbon Dioxide -----	0.053			
Methane -----	69.86	-35.20	-193.0	
Ethane -----	0.0119			
Ethylene -----	nd			
Propane -----	nd			
Propylene -----	0.0001			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			
Water -----			-66.1	-9.88

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 708

Specific gravity, calculated: 0.681

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.