ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	314175	Job #:	19699
Sample Name/Number:	007-131-103012		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/30/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	147497		
Location:	Bayou Corne / Industrial Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/31/2012	Date Reported:	11/06/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.438			
Oxygen	1.33			
Nitrogen	21.40			
Carbon Dioxide	2.99			
Methane	73.77			
Ethane	0.0728			
Ethylene	nd			
Propane	0.0007			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.43
*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. %.

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ANALYSIS REPORT

Lab #:	314176	Job #:	19699
Sample Name/Number:	007-098-103012		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/30/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	147497		
Location:	Bayou Corne / Industrial Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/31/2012	Date Reported:	11/06/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.402			
Oxygen	0.049			
Nitrogen	20.45			
Carbon Dioxide	2.27			
Methane	76.83			
Ethane	0.0031			
Ethylene	nd			
Propane	nd			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.36
*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. %.

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ANALYSIS REPORT

Lab #:	314177	Job #:	19699
Sample Name/Number:	007-072-103012		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/30/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	147497		
Location:	Bayou Corne / Industrial Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/31/2012	Date Reported:	11/06/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.372			
Oxygen	0.13			
Nitrogen	13.80			
Carbon Dioxide	3.51			
Methane	81.13			
Ethane	0.873			
Ethylene	nd			
Propane	0.153			
Propylene	nd			
Iso-butane	0.0184			
N-butane	0.0125			
Iso-pentane	0.0017			
N-pentane	0.0004			
Hexanes +	0.0004			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.52
*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. %.

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ANALYSIS REPORT

Lab #:	314178	Job #:	19699
Sample Name/Number:	007-073-103012		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/30/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	147497		
Location:	Bayou Corne / Industrial Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/31/2012	Date Reported:	11/06/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.273			
Oxygen	1.05			
Nitrogen	12.25			
Carbon Dioxide	2.52			
Methane	82.41			
Ethane	1.25			
Ethylene	nd			
Propane	0.189			
Propylene	nd			
Iso-butane	0.0253			
N-butane	0.0203			
Iso-pentane	0.0047			
N-pentane	0.0017			
Hexanes +	0.0015			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.41
*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. %.

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ANALYSIS REPORT

Lab #:	314179	Job #:	19699
Sample Name/Number:	007-081-103012		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/30/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	147497		
Location:	Bayou Corne / Industrial Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/31/2012	Date Reported:	11/06/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.334			
Oxygen	0.059			
Nitrogen	14.26			
Carbon Dioxide	3.37			
Methane	81.56			
Ethane	0.409			
Ethylene	nd			
Propane	0.0065			
Propylene	nd			
Iso-butane	0.0004			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	0.0002			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.54
*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. %.

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ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	314180	Job #:	19699
Sample Name/Number:	007-080-103012		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/30/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	147497		
Location:	Bayou Corne / Industrial Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/31/2012	Date Reported:	11/06/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.608			
Oxygen	3.78			
Nitrogen	26.71			
Carbon Dioxide	3.86			
Methane	65.03			
Ethane	0.0160			
Ethylene	nd			
Propane	0.0004			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.52
*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. %.

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ANALYSIS REPORT

Lab #:	314181	Job #:	19699
Sample Name/Number:	007-090-103012		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/30/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	147497		
Location:	Bayou Corne / Industrial Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/31/2012	Date Reported:	11/06/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	1.20			
Oxygen	17.20			
Nitrogen	54.98			
Carbon Dioxide	2.62			
Methane	23.82			
Ethane	0.180			
Ethylene	nd			
Propane	0.0047			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.64
*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. %.

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ANALYSIS REPORT

Lab #:	314182	Job #:	19699
Sample Name/Number:	007-089-103012		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/30/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	147497		
Location:	Bayou Corne / Industrial Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/31/2012	Date Reported:	11/06/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.430			
Oxygen	0.90			
Nitrogen	16.24			
Carbon Dioxide	3.93			
Methane	77.50			
Ethane	0.839			
Ethylene	nd			
Propane	0.121			
Propylene	nd			
Iso-butane	0.0180			
N-butane	0.0147			
Iso-pentane	0.0034			
N-pentane	0.0012			
Hexanes +	0.0014			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.58
*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. %.