ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	312246	Job #:	19571
Sample Name/Number:	007-098-101612		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/16/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	LDNR/Bayou Corne		
Location:	Industrial Water Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/18/2012	Date Reported:	11/08/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.419			
Oxygen	0.40			
Nitrogen	21.12			
Carbon Dioxide	2.79			
Methane	75.27	-77.45	-203.9	
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 = 0.39
*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 #:	312247	Job #:	19571
Sample Name/Number:	007-131-101612		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/16/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	LDNR/Bayou Corne		
Location:	Industrial Water Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/18/2012	Date Reported:	11/08/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.464			
Oxygen	2.27			
Nitrogen	22.79			
Carbon Dioxide	3.11			
Methane	71.29	-71.81	-196.7	
Ethane	0.0718	-28.4		
Ethylene	nd			
Propane	0.0008			
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 = 0.49
*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 #:	312248	Job #:	19571
Sample Name/Number:	007-089-101612		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/16/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	LDNR/Bayou Corne		
Location:	Industrial Water Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/18/2012	Date Reported:	11/08/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.510			
Oxygen	4.07			
Nitrogen	25.40			
Carbon Dioxide	3.66			
Methane	65.50	-65.65	-186.2	
Ethane	0.723	-25.6		
Ethylene	nd			
Propane	0.101	-23.4		
Propylene	nd			
Iso-butane	0.0148			
N-butane	0.0121			
Iso-pentane	0.0030			
N-pentane	0.0013			
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 = 0.60
*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 #:	312249	Job #:	19571
Sample Name/Number:	007-072-101612		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/16/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	LDNR/Bayou Corne		
Location:	Industrial Water Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/18/2012	Date Reported:	11/08/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.439			
Oxygen	1.69			
Nitrogen	20.86			
Carbon Dioxide	2.46			
Methane	73.86	-69.59	-190.4	
Ethane	0.559	-26.5		
Ethylene	nd			
Propane	0.106	-23.0		
Propylene	nd			
Iso-butane	0.0158			
N-butane	0.0094			
Iso-pentane	0.0012			
N-pentane	0.0002			
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 = 0.48
*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 #:	312250	Job #:	19571
Sample Name/Number:	007-073-101612		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/16/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	LDNR/Bayou Corne		
Location:	Industrial Water Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/18/2012	Date Reported:	11/08/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.304			
Oxygen	1.25			
Nitrogen	14.95			
Carbon Dioxide	2.05			
Methane	80.29	-60.78	-178.4	
Ethane	0.953	-26.98		
Ethylene	nd			
Propane	0.151	-23.9		
Propylene	nd			
Iso-butane	0.0240			
N-butane	0.0191			
Iso-pentane	0.0049			
N-pentane	0.0018			
Hexanes +	0.0020			

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.39
*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 #:	312251	Job #:	19571
Sample Name/Number:	007-080-101612		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/16/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	LDNR/Bayou Corne		
Location:	Industrial Water Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/18/2012	Date Reported:	11/08/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.809			
Oxygen	10.91			
Nitrogen	42.43			
Carbon Dioxide	2.83			
Methane	43.01	-80.49	-202.1	
Ethane	0.0105			
Ethylene	nd			
Propane	0.0005			
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 = 0.62
*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 #:	312252	Job #:	19571
Sample Name/Number:	007-081-101612		
Company:	Shaw Environmental & Infrastructure		
Date Sampled:	10/16/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	LDNR/Bayou Corne		
Location:	Industrial Water Wells		
Formation/Depth:			
Sampling Point:			
Date Received:	10/18/2012	Date Reported:	11/08/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.378			
Oxygen	0.45			
Nitrogen	16.54			
Carbon Dioxide	3.60			
Methane	78.63	-69.88	-195.3	
Ethane	0.394	-28.8		
Ethylene	nd			
Propane	0.0058			
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 = 0.55
*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. %.