



## METHANE SOURCE IDENTIFICATION

As new technologies make the extraction of oil and gas deposits from shale formations possible, landowners, industry regulators and energy companies are seeking practical guidelines to develop these valuable resources in a manner that is cost-effective, environmentally sound and protective of all stakeholders. Pre-drill studies of surrounding water systems have become a standard practice to establish a baseline for each water system in the event that contamination is suspected at a later date. Some states are taking the next step, and in the event of a methane exceedance during pre-drill studies, are requiring further testing to characterize the methane and determine its likely source. This approach is scientifically sound, mitigates risk for all parties and seems likely to be adopted by other states.

The current accepted practice for Methane Characterization and Source Identification involves two analytical methods: Compositional Analysis of the (C1-C6) compounds in water, coupled with Stable Isotope Analysis of the carbon and hydrogen components of the methane to establish a fingerprint and determine its source. When included as part of a comprehensive pre-drill study, these methods can provide assurance to the exploration company and landowner that an exceedance of methane can be analyzed and characterized to minimize any risks associated with drilling. Pace Analytical can provide these new analyses as part of its complete testing solution to support oil and gas exploration in shale formations.

### Two-Dimensional Stable Isotope Analysis:

- Isotopic Carbon Ratio ( $\delta^{13}\text{C}$ )
- Isotopic Hydrogen Ratio ( $\delta^2\text{H}$ )

### Compositional Analysis (C1-C6):

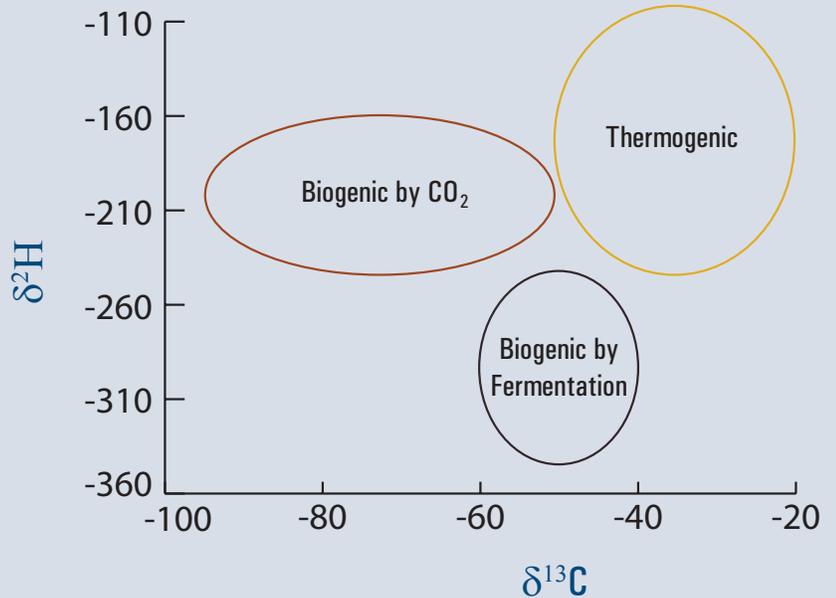
- methane
- ethane
- propane
- n-butane
- iso-butane
- pentane
- iso-pentane
- n-hexane
- argon
- carbon dioxide
- oxygen
- nitrogen
- hydrogen

### For more information about methane source identification:

Call: 423.307.2906 or  
Email: [forensics@pacelabs.com](mailto:forensics@pacelabs.com)

## Methane Origin

### General Isotopic Composition of Methane



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