

ISOTECH Analyses Now Available at Geotech in Perth, Western Australia



Geotech is pleased to announce the opening of an Isotech Satellite Laboratory at its premises in Perth, Western Australia. This endeavour is the culmination of several years of work and allows us to provide Isotech quality data through Geotech for clients in Australasia without the cost and delays resulting from the shipment of samples to Isotech headquarters in Champaign, IL, USA. The Satellite Laboratory at Geotech consists of analytical systems that duplicate those used at Isotech's main facility, primarily designed for compositional and isotopic analysis of mudgas and headspace gas samples. The systems were designed, constructed and tested in Champaign before being dismantled and shipped to Perth where they were reassembled by experienced scientists. The unique aspect of this arrangement is that the equipment is both monitored and controlled remotely from Isotech's main laboratory in the US via the internet. This is truly an Isotech system, merely deployed within the walls of Geotech instead of in the Champaign Laboratory, allowing Geotech to report data to their clients within days rather than weeks.

This Isotech Satellite Laboratory has become reality because of Isotech's affiliation with Geotech. Geotech's personnel will oversee and provide the needed care of the instruments, and the infrastructure within their building is an excellent place to house the Satellite Laboratory. Geotech, like Isotech, is dedicated to providing their clients with the best possible service. For Geotech clients not currently utilizing isotope data as an analysis tool, we are hopeful that the speedy generation of their data will encourage them to add this service to the suite of analyses currently being provided by Geotech.



The isotopic and compositional data from the Isotech Satellite Lab equipment will be reported by Geotech, but the data are actually generated by Isotech, as the instrument outputs are transmitted directly to the Champaign facility via the internet, where the analyses and calibration are carried out by the same scientists who have been regularly performing this function for many years. In addition to supplying hardware that duplicates the instruments in Champaign, sample handling procedures and protocols at the Satellite Lab are the same as the ones Isotech have used for many years. The main difference is that Geotech's personnel log in the samples, assign sample numbers and load the samples onto the autosampler trays. From that point, the analyses are controlled by the same Isotech personnel who would run the instruments if they were set up in Champaign, using identical methods for creating analysis sequences. After completion of the analysis, Geotech will report the data to their clients.

The main hardware components installed at Geotech are a gas chromatograph (GC) for compositional analysis and a second GC, coupled with an isotope ratio mass spectrometer (IRMS), for stable isotope analysis of light hydrocarbon gases. Each system is equipped with its own autosampler. All of the instruments and computers are connected to a high capacity Uninterruptible Power Supply, which provides clean power for smooth operation of the instruments and also ensures against system shutdowns during temporary power failures.



The compositional GC is designed to accommodate gas samples ranging from mudgas samples, which are predominantly air with low hydrocarbon concentrations, to production gases with over 90% methane. The dynamic range of the instrument will allow detection of hydrocarbons down to 1ppm and up to 100% methane. In addition to the C1-C5 and C + hydrocarbons, data for CO₂, N₂, O₂+Ar, H₂, and CO will also be obtained. Isotech has supplied Geotech with the same GC calibration standards and check samples as those used in Champaign, to ensure that the data produced in Perth are equivalent to the data produced in Champaign, and results of the standards can be directly compared to verify that the instrument is working properly.

Whilst we consider the compositional analysis capabilities extremely important, the crowning jewel and by far the most sophisticated part of the Satellite Laboratory is the isotope system. Isotech's 20+ years of experience and highly skilled support staff were critical in the successful implementation of this system. Isotech's facility in Champaign has numerous gas isotope systems, both traditional offline prep systems and the newer GC-IRMS systems like the one deployed in Perth, and the data generated from these systems are the basis of Geotech's quality control procedures. Isotech has provided Geotech with a suite of isotope standards which have been calibrated and analysed on numerous systems, ensuring that the data produced in Perth match those produced in Champaign. The instrument in Perth is calibrated daily against the same suite of gas samples used daily in Champaign. Additionally, instrument tests and scans can be controlled remotely via the internet to monitor machine performance and stability. The working standards vary in gas concentration and isotopic values to ensure that the instrument is accurate over a range of values, from biogenic to thermogenic sources.

The IRMS system is primarily designed for analysis of mudgas and headspace gas, and therefore is equipped with an enrichment device for carbon isotope analysis of C2+ hydrocarbons at very low concentrations (down to approximately 10 ppm). The precision for carbon is +/-0.3 per mil (0.5 per mil for enrichments). The system is also equipped with a pyrolysis reactor for hydrogen isotope analysis of methane at concentrations down to approximately 100 ppm, with a precision of +/- 5 per mil. Although the system was designed for mudgas, it will accommodate production gas, but it may not be suitable when higher precision data are required for some applications, such as compartmentalization studies.