

## **Development and Calibration of New Natural Gas d13c and d2h Reference Standards**

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### **Abstract**

In 2007, the National Institute of Standards and Technology (NIST) published a report certifying the stable carbon isotope values of three natural gas standards. These reference materials included a coal-associated gas (RM 8559), an oil-associated gas (RM 8560), and a biogenic gas (RM8561) (Wise and Watters, 2007), NGS1, NGS2, and NGS3, respectively (G. Hut, 1985). Distributed by the Chevron Oil Field Research Company and for more than thirty years, these materials were used as natural gas isotopic standards by industry, academia, and governmental agencies.

Recently the supply of these isotopic gas standards was exhausted and NIST discontinued their distribution. Although a recent round-robin inter laboratory study of select natural gases from China was conducted (Dai et al., 2012) in a presumed effort to replace the NGS gases, this was not a true calibration and the new gases were not made available for general use as reference standards.

In response, the Energy Resources Program of the U.S. Geological Survey (USGS) initiated a project to develop a new suite of natural gas standards to replace the exhausted supply of NGS gases. This project is a collaborative effort by researchers from academic, governmental, and industrial organizations from around the world. USGS personnel took the lead to administer and coordinate the work related to the development of new standards including, but not limited to: (1) identification of an international technical advisory committee, (2) collection of gas samples, (3) distribution of the gases for calibration and round-robin analyses, (4) compilation and statistical analysis of the calibration data, (5) preparation of a final report, and (6) storage and distribution of the new gas standards. All analytical work related to this project is complete, carbon and hydrogen isotope values have been assigned, and the gases are ready for distribution. This presentation summarizes the USGS effort to produce three new natural gas isotope standards.