A New Application of Low Altitude Airborne Multispectral Mapping of Rock Microfractures and Joint Systems to Maximize Conventional and Unconventional Hydrocarbon Production and Related Sequestration Injection of Carbon Dioxide,

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This method generates low altitude airborne multispectral data to detect and map microfractures and joint systems, and has been developed and tested over the past 20 years as the Geoflite System. The method maps joints and fractures through soil cover and vegetation, by imaging and measuring geochemical leakage in the soil directly above the joint systems.

These microfracture systems have been shown to control the production of methane gas from black shales and coal seams, and drilling the fracture intersections is the key to rapid dewatering of the rocks to achieve maximum production. Furthermore, the trace element leakage geochemistry at these intersections has been shown to be indicative of the potential hydrocarbon production. This same data also indicates the best locations on the fracture sets for the injection of fluids and gases, to achieve maximum carbon sequestration from carbon dioxide, and the most efficient related enhanced hydrocarbon recovery anticipated from these formations.