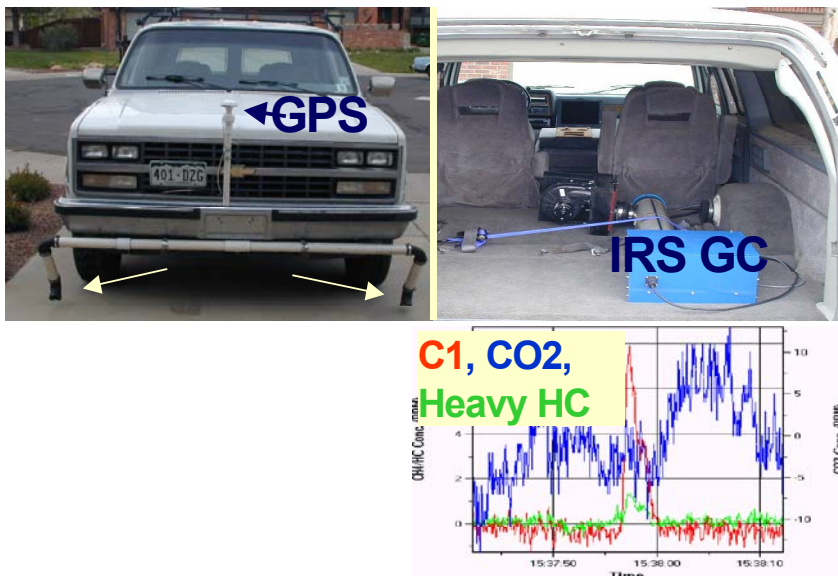


ABSTRACT- Apogee Ground Survey of the Raton Basin for Methane Seeps

The Raton Basin is located in south central Colorado with an area of approximately 1,300 square miles. The basin is underlain by two coal seams, the Raton and the Vermejo. These coals outcrop around the basin and within the basin. Raton and Vermejo coals have been mined for over one hundred years. Currently, the coals within the basin are being drilled to produce methane. A project was undertaken by the Colorado Oil and Gas Conservation Commission (COGCC) to identify the existing historical methane seeps, and to the extent possible, identify and document conditions prior to coalbed methane development. Apogee Scientific, Inc. (ASI) was contracted by COGCC to fulfill a part of phase one of this project, a ground survey to locate methane seeps within the Raton Basin. This report documents the ground survey conducted by ASI.

This survey was conducted using a 4-wheel drive vehicle equipped with an infrared-based gas detector developed by ASI. This gas detector was designed to find leaks in natural gas pipelines, and is referred to as the Apogee Leak Detection System (LDS). The LDS is a three-channel instrument capable of measuring methane (CH_4), total hydrocarbons (HC) and carbon dioxide (CO_2) at sub part per million (PPM) concentrations and a speed of 10 samples per second. The vehicle was also equipped with a Global Positioning System (GPS) based navigation system. The navigation system consisted of a Garmin III+ GPS, and a computer running the Delorme Street Atlas program. In addition to the LDS and navigation system, the vehicle was equipped with a differential GPS, wind speed, wind direction, and temperature sensors. The survey vehicle is shown in Figure 1.

Figure 1. Survey vehicle (from Gorody 2003)



The survey took place between November 9, 2000 and April 11, 2001. A total of 216 hours on 26 different days was spent surveying the basin. During this time, 2749 miles were driven within the basin plus an additional 1499 miles were driven around the edge of the basin in order to obtain access to the basin. A total of 67 seeps were located.