

## ***Frontier Analysis, Ltd***

### **TECHNICAL SERVICE RESPONSE NO.: UT066**

**Subject:** Identification of Black Particulates found near a Bovine Excision Site (Colorado, March 8, 2009)

**Date:** July 16, 2009

**Requested By:** William C. Levengood  
Pinelandia Biophysics Lab

**Reported By:** P. A. Budinger  
Analytical Scientist

#### **Background/Objective:**

The background of this event was related to this laboratory via a phone conversation with W. C. Levengood on 13 July 2009. A bovine excision occurred on a ranch in Colorado on March 8, 2009. Black particulates were found near the animal. The object is to identify the black particulates.

#### **Conclusions:**

The black particulates are identified as coal. No other materials are detected. This may be native to the area, or transported to the area from another source.

#### **Procedure:**

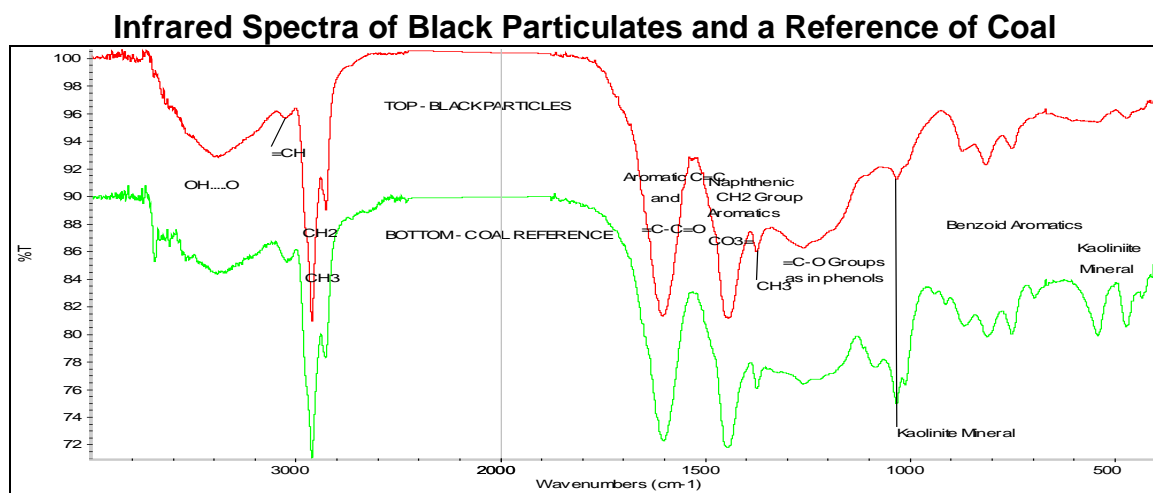
The sample of black particulates is identified as "Test Series II (lab. Code KS-08-07)". They were received on June 12, 2009 in a plastic container.

Multiple infrared spectra were obtained from the sample 'as received'. All spectra were taken on the Thermo Electron Avatar 360 spectrometer using the Smart Herrick diamond sampling accessory.

#### **Results:**

Infrared analysis shows the black particulates are coal. The spectra compare to a reference of coal. Coal is made up of a complex composition of hydrocarbons, oxygenated hydrocarbons and minerals. The black particulates have less kaolinite mineral matter than the reference. Following are spectra of the black

particulates and a reference of coal for comparison. (Pertinent functional groups are identified on one representative particulates spectrum displayed below.<sup>1</sup>)



File: UT066

Phyllis A. Budinger

<sup>1</sup> R. A. Friedel and H. L. Retcofsky, "Spectrometry of Fuels", Plenum Press, New York , 1970, pg 50.