

Residence Time of Light Alkanes in Soils, Daniel H. Vice, Hazleton Campus, Pennsylvania State University, 76 University Dr., Hazleton, PA 18202; and Philip M. Halleck, Pennsylvania State University, 152 Hosler Building, University Park, PA 16802

Four surveys of 25 closely spaced soil samples each were conducted over a leak in a natural gas pipeline to study the lack of repeatability of surface geochemical surveys. These surveys were over a gas field in Centre County, Pennsylvania. The first survey was conducted 2 days before a leak in the pipeline was repaired. The second survey was conducted 6 days after the leak was repaired; the third 29 days afterwards; and the fourth 97 days afterwards. Approximately 50 cubic centimeters of soil were collected using an oakfield hand sampler and placed in a glass vial and sealed with a Teflon cap. These samples were analyzed in a gas chromatograph for the light alkanes, methane, ethane, propane, butane, and pentane, using a modified headspace method.

A one-way analysis of variance of the sample data suggested that two statistical populations of light alkanes were present. Next the data were compared using Fisher's pairwise comparisons, which show that the first survey represents one population while the latter three surveys represent a second population.

Graphical presentation of the light alkane concentrations from the four surveys versus time shows a rapid decline after the leak was repaired. Methane concentrations declined the most rapidly, while pentane showed a slight increase before declining. Light alkanes in the fourth survey were similar both in concentrations and in composition to samples previously collected over the Sabinsville gas storage reservoir. This suggests that the light alkanes have a residence time of approximately 3 months in the soil environment.