Assessing the Impact of Unconventional Drilling on Soil and Air Quality

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Concerns about the environmental impact of fossil fuel extraction activities (i.e. hydraulic fracturing, and other drilling and well-stimulation techniques) have risen due to their wide use in the United States and in other countries. Soil and air quality can easily be effected by semivolatile organic compounds (VOCs), such as: benzene, toluene, ethylbenzene, and xylenes (BTEX) as a consequence of industrial activity. Quantification of BTEX from soil poses a challenge due to its complex composition (sand, clay, silt); a variable response depending on composition reduces precision and accuracy of soil contamination determinations. In this study, soil samples were collected from the Eagle Ford Shale and analyzed using an established EPA method. In an effort to reduce and normalize matrix effect associated with varying soil composition; the application of ionic liquids (ILs) as a solvent, in headspace gas chromatography mass spectrometry (HS-GC/MS) were evaluated. In addition, we investigate the use of an open source program ImageJ, a National Institute of Health analysis software, to eliminate sampling bias from returned residential home air filters near industrial activities.