

Initial results reported as lab analyzes clay samples from North Dakota oilpatch

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(Phys.org)— Initial results of clay samples from western North Dakota show varying percentages of alumina content, a finding of interest to the North Dakota Geological Survey that commissioned the study. Scientists in a lab at North Dakota State University's Center for Nanoscale Science and Engineering (CNSE) are completing analysis of the clay, often referred to as kaolin, which could eventually play a role in proppants used for hydraulic fracturing in North Dakota oil exploration.

As part of a research agreement with the North Dakota Geological Survey (NDGS) in Bismarck, N.D., the Materials Characterization and Analysis Laboratory at NDSU CNSE is completing [initial analysis](#) of more than 200 clay samples from Stark and Dunn counties in North Dakota to determine their composition and suitability for use as a component in [hydraulic fracturing](#). "The alumina (Al₂O₃ content) was above 20 percent for 66 percent of the Bear Den claystone samples and 38 percent of the Rhame Bed samples," said Ed Murphy, North Dakota state geologist. "Roughly one third of the sites sampled averaged above 20 percent alumina for the entire exposed bed thickness."

A final report of the study conducted at NDSU CNSE is expected in late 2012 or early 2013. "We generated an alumina [map](#) of western North Dakota that companies can use to guide clay exploration if they determine that the alumina content is insufficiently high for their needs," explained Murphy. "We will publish a final report with the clay mineralogy when that information is available."

Murphy said it was extremely useful to have specialized scientific expertise available in North Dakota to conduct the study. "CNSE utilizes excellent analytical equipment and employs knowledgeable people with valuable experience. We have had a very good working relationship with the NDSU CNSE. We found them to be very dedicated to their work and generating a product that we could have confidence in."

The clays show early promise for potential use as a key material known as ceramic proppant, used in the fracking process to help keep fractures open, particularly in the Bakken Formation in North Dakota. "It could potentially lead to the establishment of a ceramic proppant manufacturing plant if these claystones are determined to be suitable for this process. The chemistry and bed thickness that we are providing will answer a number of the initial questions from industry," explained Murphy. "If companies deem these results to be promising, they could

potentially do additional exploration on their own which might ultimately lead to test manufacturing of ceramic proppant using these clays."

Currently, proppants used in western North Dakota oil development typically come from other states or other countries. Murphy notes that companies will use approximately five million tons of proppants in North Dakota oil development in 2012. In a recent report, the North Dakota [Geological Survey](#) estimates about 1.7 billion tons of economically mineable kaolin in western North Dakota.

Researchers at NDSU CNSE use x-ray fluorescence to determine which elements and how much of those elements the samples contain. CNSE scientists also conduct analysis of clay samples using x-ray diffraction to determine the amount of kaolinite, illite, chlorite and other substances in the samples.

"We frequently partner with agencies and industry on projects," said Philip Boudjouk, vice president for research at NDSU. "CNSE provides specialized instrumentation and scientific expertise to a variety of research partners across a spectrum of industries."

More information: www.dmr.nd.gov/ndgs/Clay%20map/GI_158.pdf

Provided by North Dakota State University

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