Potential for Economic Development of Silica Sand Deposits in Louisiana for Use as Proppant in Hydraulic Fracking

L. Riley Milner and Chacko J. John

Louisiana Geological Survey, Louisiana State University,
3079 Energy, Coastal and Environment Bldg. Baton Rouge, Louisiana 70803

ABSTRACT

This preliminary investigation was undertaken to assess the potential for silica sand deposits in the State of Louisiana for the use as proppant sands in the hydraulic fracking operations in Louisiana. The increase in drilling operations in the Haynesville Shale Gas play in northwestern Louisiana, and potential in the Tuscaloosa Shale in south-central Louisiana and in the "Florida" parishes in southeastern Louisiana have increased the need for silica sand as proppant in the hydraulic fracking operations. Two areas were sampled for analysis as proppant. The areas are near Sicily Island, Louisiana, and Aimwell, Louisiana, in the Catahoula Sandstone and in the Amite River Basin. Four samples were collected, two in the Catahoula Sandstone, and two in the Amite River Basin. All four samples show a respectable volume of the bulk composite samples submitted for sieve analysis in the 40/70 sieve fraction. The 40/70 sieve size is the most common grain size used for hydraulic fracking. Each sample was analyzed using International Organization of Standards (ISO) protocol analyses tests ISO 13503–2/API, Section 7, "Proppent Sphericity and Roundness;" Section 8, "Acid Solubility;" Section 10, "Procedures for Determining Proppant Bulk Density, Apparent Density;" and Section 11 "Proppant Crush-Resistance Test." All four samples were within the range of acceptability for the use as hydraulic frack sands.

The success of hydraulic fracturing technology resulting in increased hydrocarbon production has caused the oil and gas industry, beginning in the 2000s, to increase its demand for frack sand, referred to as proppant. Proppant is used in hydraulic fracking operations related to shale gas plays such as the Haynesville Shale Gas play in northwestern Louisiana and the Tuscaloosa Shale in southeastern Louisiana into central Louisiana and in other states in the country. The announcement that UNIMIN Resin Coating Sands, a new business operation near Sibley, Louisiana, for the resin coating of frack sand provides a logistical solution to the cost of transport of sand for handling and distribution. Near Natchez, Mississippi, a partnership has been developed between a local sand and gravel business and a Canadian company to mine, process, and resin coat natural silica sand for the use as proppant. Natural sand proppant is imported from locations elsewhere in the U.S. and globally from China, Russia, South America, Canada, and other sites. This makes it that much more important to evaluate the local resources to meet the growing demand for natural sand proppant.

A typical well in the Haynesville shale uses 2.5 to 5 million lbs of proppant based on a previous article, that also indicated a typical rail car holds approximately 100 tons (200,000 lbs) of sand, and a 5 million lb. frack job will require 25 rail cars. The fact that few, if any, wells are located near a rail line the proppant must be trucked to the site. At 50,000 lbs per truck a 5 million lb. job will require 100 truckloads. The increased demand for proppant has created an overall shortage of sand that meets the requirements for proppant.