NORTH DAKOTA GEOLOGICAL SURVEY

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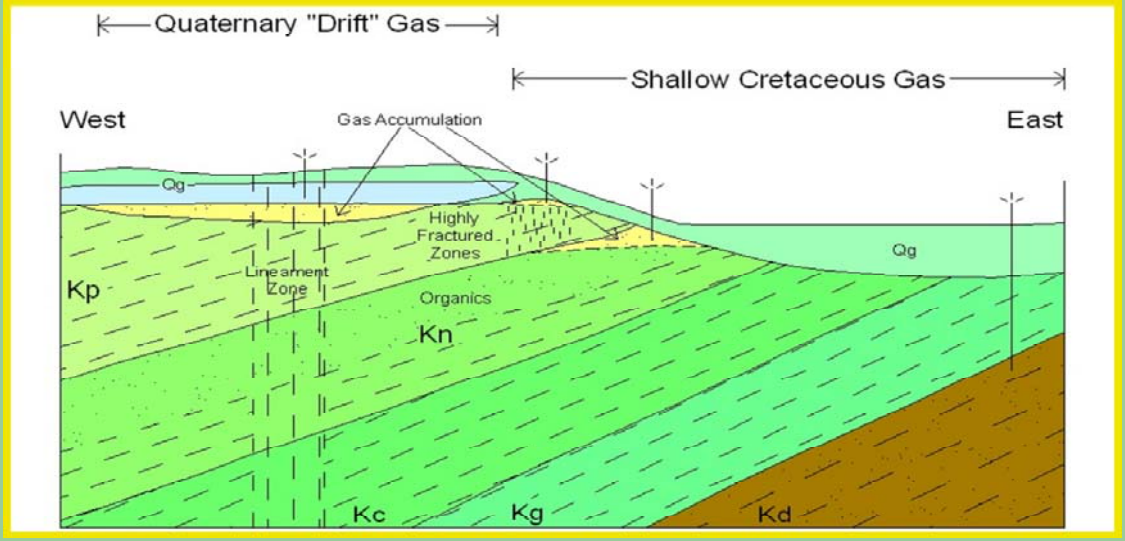
SHALLOW NATURAL GAS OCCURRENCES IN QUATERNARY DEPOSITS IN NORTH DAKOTA



Conceptual geologic model of shallow gas generation and accumulation within Quaternary and Cretaceous age sediments in North Dakota.

NDGS GEOLOGICAL INVESTIGATIONS NO. 25 (GI-25)

Abstract

Shallow natural gas occurs within several near surface geologic environments in North Dakota. Accumulations of gas have been observed or inferred to originate within glacial sediments accumulating as the result of glaciotectonic processes and anthropogenic means. Historically, gas has been produced from fields in Renville and Bottineau Counties. Geologic conditions and potential sourcing consist of a subcrop of Cretaceous marine sediments scoured and mantled by glacial sediments with contained organics as a potential source. Glaciotectonic ice-thrust masses, several square kilometers in areal extent, and structures within Cretaceous units, may impose structural control on shallow subsurface fluid flow. The advance and retreat of glacial ice across the northern Great Plains and subsequent sediment unloading may influence development of horizontal partings and vertical fracturing within glacial sediments and the underlying sedimentary strata, providing conduits for shallow gas flow. Gas-rich clay deposits up to 80 feet thick are present beneath 15 playa lakes in northwestern North Dakota. These deposits consist primarily of black, organic-rich clays and crystalline layers of sodium sulfate of Holocene age. Borehole gas emanations and gas pockets beneath salt layers were observed along with gas escaping from vents on the bottom of Miller Lake in Divide County. Anthropogenic methane generation has been documented within landfills in Minot, Harvey, Williston, Grand Forks, and Hillsboro. More than 400 cfm of gas has been extracted from a recently installed gas collection system in Fargo. Over 300 MCF of this gas has been used locally as an alternative industrial fuel source.

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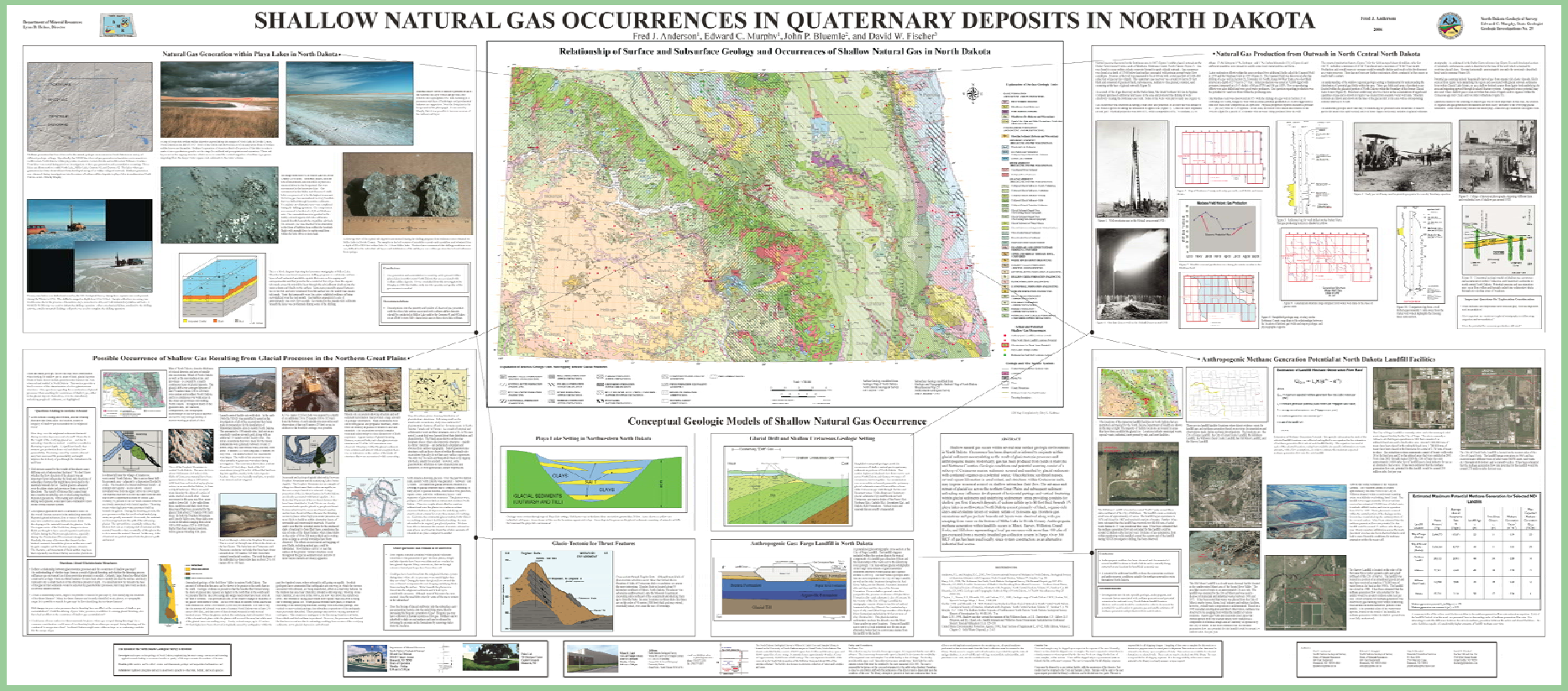

North Dakota Geological Survey Geological Investigation No. 25 (GI-25) is a large format poster size publication that is available for download adn viewing from the NDGS website at: http://www.state.nd.us/ndgs/Shallowgas/AAPG ND Natural/Gas.pdf or as a hardcopy poster from the NDGS publications department.

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