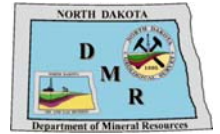


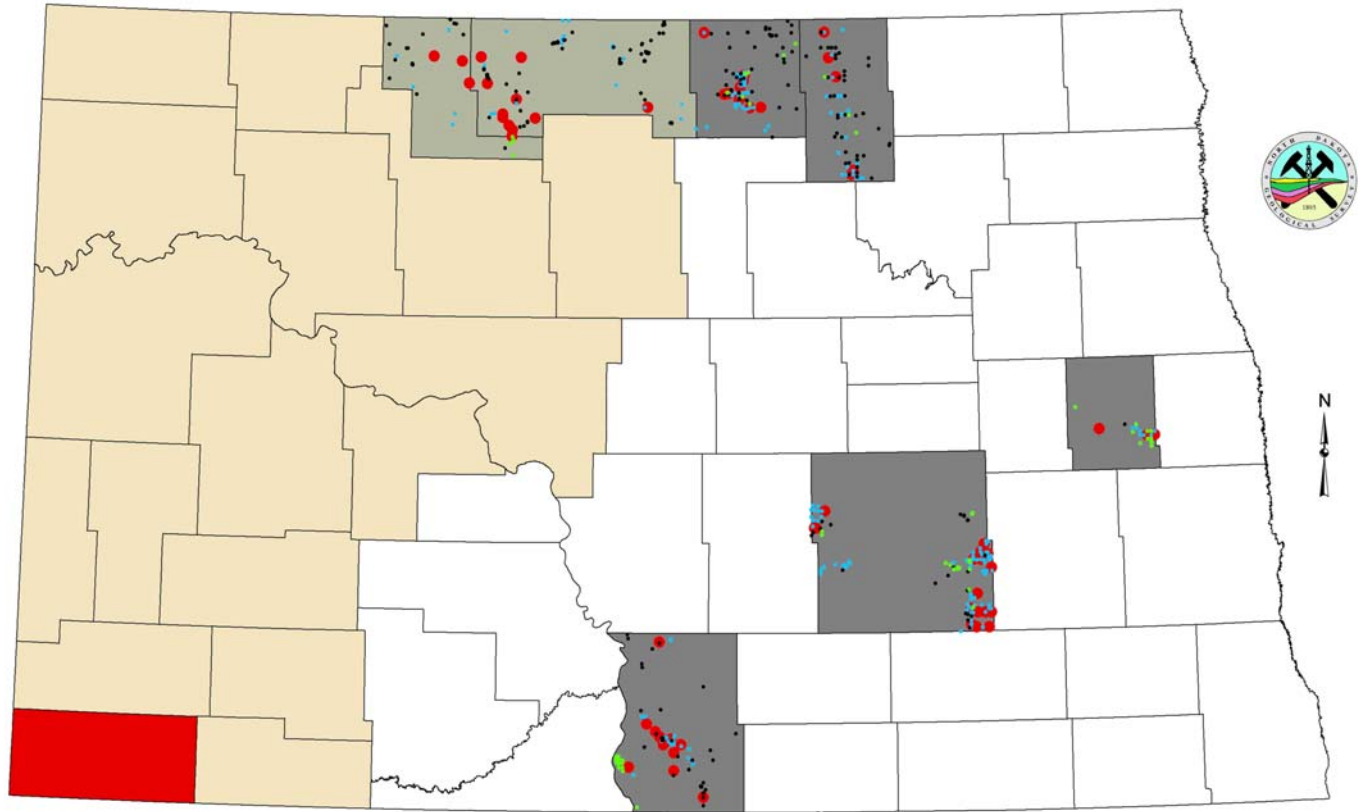


# NORTH DAKOTA GEOLOGICAL SURVEY

*Geological Information for North Dakota*



## FIELD SCREENING FOR SHALLOW GAS IN NORTH DAKOTA



County map of North Dakota highlighting the selected counties where shallow gas field screening was conducted in the Fall of 2006 (counties highlighted in gray). Results of the field screening investigations are shown as colored points (red showing a positive methane detection). Oil (tan) and shallow gas (red) producing counties are also shown.

## NDGS GEOLOGICAL INVESTIGATIONS NO. 42 (GI-42)

### Abstract

Shallow gas field screening of ground-water monitoring wells was conducted in seven counties in the glaciated portion of North Dakota: Steele, Bottineau, Renville, Emmons, Stutsman, Rolette, and Towner, from September to November of 2006. Wells were field screened for  $\text{CH}_4$  using a portable Flame-Ionization Detector (FID) calibrated to  $\text{CH}_4$  in air at a concentration of 101 parts per million (ppm) for low-span screening from zero to 10,000 ppm  $\text{CH}_4$ . Calibration gas concentrations of 10,000 ppm  $\text{CH}_4$  in air was used where gas occurrences were found  $>1\%$ . Samples of the air column at the monitoring well top of casing and ground-water/atmospheric interface were analyzed. A total of 636 observation well locations were investigated. More than 200 wells did not exist at prescribed locations in the field and were presumed abandoned or destroyed. The remaining 331 wells were field screened for  $\text{CH}_4$ . Sixty-six of the wells field screened showed a positive FID response. The remaining 224 wells showed no response.  $\text{CH}_4$  was detected in several wells that were screened within coarse unconsolidated glacial drift, of which (~30%) contained detrital lignites within the intervals monitored, at depths ranging from 38 to 327 feet (11.6 to 99.7 meters).  $\text{CH}_4$  occurring within wells screened within upper Cretaceous sedimentary bedrock of the Fox Hills Formation and Quaternary glacial sediments directly overlying Cretaceous marine shales of the Pierre Formation was also detected. Detected  $[\text{CH}_4]$  ranged from 0.2 ppm to 30,362 ppm. The results indicate detected shallow gas to be of late-generation biogenic type originating from within organic laden discontinuous glacial drift sediments and shallow Cretaceous bedrock.

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