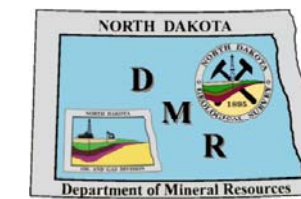


**SHALLOW GAS FIELD SCREENING IN SOUTHEASTERN STEELE COUNTY, NORTH DAKOTA**

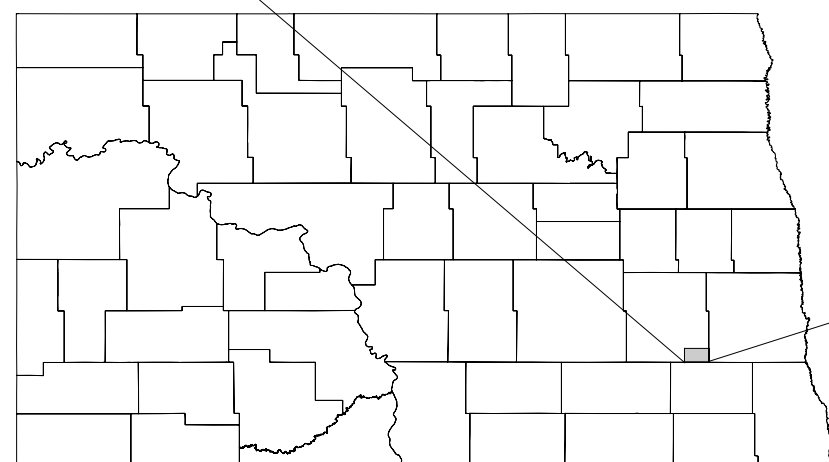
The investigation of shallow natural gas occurrences within selected existing ground-water observation wells in Steele County, North Dakota was conducted on September 11, 2006. A total of 15 observation well sites, consisting of historic and existing observation wells were reviewed prior to the field component of this investigation. Eleven of these observation well sites were selected to be visited in the field to (1) determine the existence of the well, (2) verify its location, and (3) perform shallow gas field screening. Seven observation well sites were not visited during this investigation. Three of the eleven wells visited returned a positive numerical FID response as methane. Each of the wells were field screened for the presence of combustible gasses using a portable flame-ionization detector (FID) calibrated to methane in air (101 ppm low-span or 10,000 ppm high-span). The FID was used solely for field screening on all wells. Instrument response was collected at the top of well casing (TOC) and just above the groundwater/air interface, after the collection of a depth to water level reading using an electric well tape. Of the existing wells that were field screened, three wells returned positive FID responses, ranging from 2.0 ppm to 146.3 ppm as methane. One well (145-56-4DDD) recently installed by the North Dakota State Water Commission returned responses of 89.2 ppm and 46.3 ppm, shortly after the first reading, from just above the groundwater/atmospheric interface. This shallow well is completed and screened within the Cretaceous Pierre Shale.

**EXPLANATION**

- 89.2 Ground-water observation well with positive FID response as methane in parts per million (ppm).
- 0 Ground-water observation well with no FID response (0).
- NV Ground-water observation well site not visited during this investigation.
- WNF Ground-water observation well not found at prescribed location.



**Fred J. Anderson**  
2006

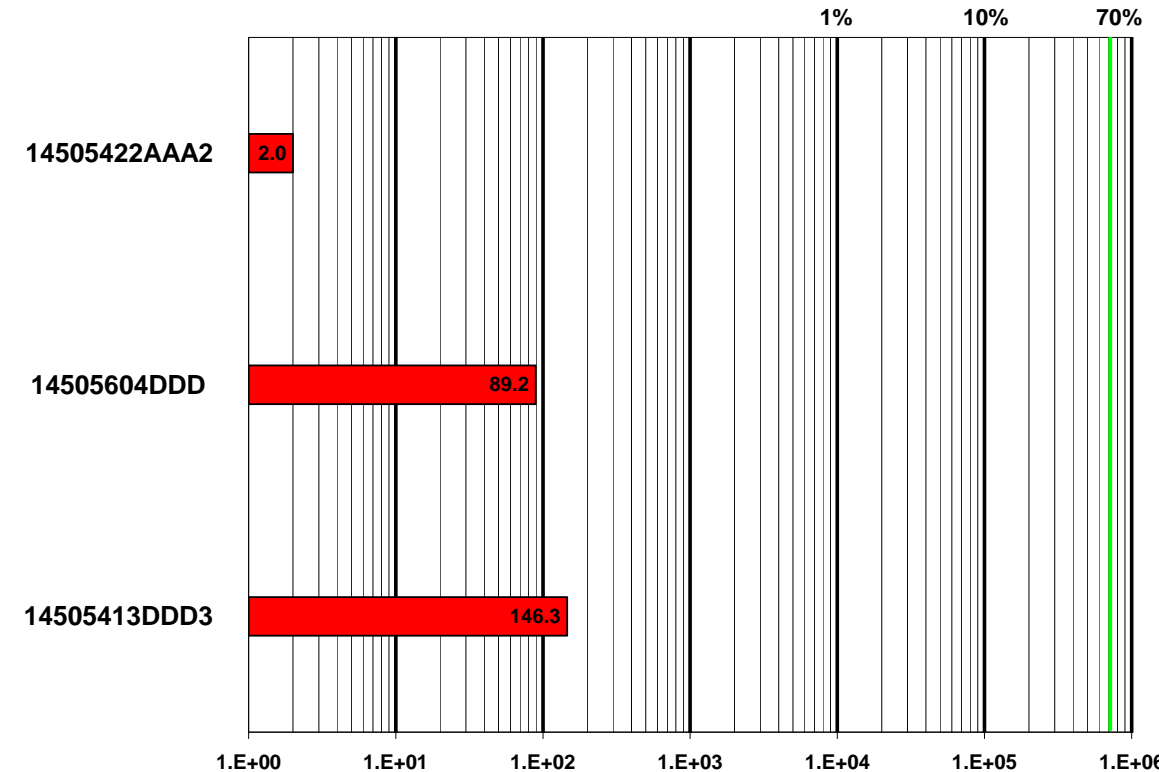


LOCATION OF INVESTIGATION IN STEELE COUNTY, ND

**REFERENCES**

- Bluemle, 1975, Geology of Griggs and Steele Counties, North Dakota Geological Survey Bulletin No. 64 - Part I., 50 p.
- Downey, J.S., Hutchinson, R.D., and Sunderland, G.L., 1973, Ground-Water Basic Data for Griggs and Steele Counties, North Dakota, North Dakota Geological Survey Bulletin 64-Part II., 468 p.
- Downey, J.S., and Armstrong, C.A., 1977, Ground-Water Resources of Griggs and Steele Counties, North Dakota, North Dakota Geological Survey Bulletin No. 64-Part III., 33 p.
- NDSWC, 2006, North Dakota State Water Commission Online Ground-Water Information Database, <http://www.swc.state.nd.us>

**FID INSTRUMENT RESPONSE AS METHANE**



Graphical depiction of FID instrument response in parts per million (ppm) for wells in the study area. Logarithmic scale of methane concentration in ppm is shown on the x-axis in addition to the average concentration of methane in commercial natural gas at 70% depicted by the vertical green line.

**SUMMARY OF OBSERVATION WELL CONSTRUCTION INFORMATION**

Date	Well Location			FID Response	Screened Interval	Total Well Depth
	PLSS	Longitude	Latitude			
10/20/04	14505413DDD3	-97.47561	47.36918	146.3	75-80	100
06/14/06	14505604DDD	-97.79533	47.39861	89.2	50-60	60
06/29/06	14505422AAA2	-97.51810	47.36749	2.0	74-79	106
11/30/99	14505501DDD2	-97.60320	47.39828	0.0	36-41	50
07/20/04	14505408BBB	-97.58093	47.39710	0.0	55-60	160
07/13/04	14505417DDD	-97.56039	47.36840	0.0	93-98	280
11/30/99	14505409CCC2	-97.55891	47.38390	0.0	45-50	58
07/19/04	14505415CCC2	-97.53830	47.36824	0.0	78-83	100
07/26/04	14505413AAA2	-97.47466	47.38243	0.0	27-32	40
12/01/99	14505410DDD2	-97.51792	47.38403	0.0	15-20	23
01/01/68	14605709BAA	-97.93373	47.48405	NV	0-80	80
11/30/99	14505513AAA2	-97.60337	47.38143	NV	46-51	58
07/20/04	14505405BBB2	-97.58102	47.41163	NV	35-40	60
10/21/04	14505432AAA	-97.56047	47.33809	NV	68-73	147
07/28/04	14505427AAA	-97.51756	47.35353	NV	87-91	200
07/27/04	14505426AAA3	-97.49640	47.35375	NV	58-63	80
07/15/04	14505414DDD2	-97.49608	47.36834	NV	55-60	80
07/19/04	14505413BBB	-97.49561	47.38274	NV	75-80	280
10/21/04	14505436CCC	-97.49517	47.32548	NV	78-83	280
10/20/04	14505425CCC2	-97.49492	47.34027	NV	75-80	100
10/30/70	14605534DDD	-97.64605	47.41276	WNF	48-51	120

Observation well information from NDSWC (2006).