

Operator: Tidewater Oil Co. and Wolf's Head  
 Oil and Refining Co. (South Penn Oil Co.)  
 Farm: E.D. Smith  
 Well No: 1 (one)  
 Location: Scott County, Early Grove Field  
 6450' S of 36°40'  
 4650' E of 82°20' approximate  
 Elevation: 1456.3' Ground, 1467.5' Kelly Bushings  
 Total Depth: 7220' (samples); 7222' (electric log)  
 Commenced: September 9, 1963  
 Completed: February, 1964  
 Result: **Gas Well (shut in)**

Geologic Log;  
 Samples examined by  
 Warren J. Souder,  
 Virginia Division of  
 Mineral Resources  
 June, 1965

#### Formation Tops

Samples are available from 19' to  
 7220'.

<u>Depth</u>	<u>Formation</u>
30'	Undifferentiated Mississippian Gasper and Ste. Genevieve formations; first good sample within these formations
2250'	Hillsdale (?) limestone  (Tentatively this unit is called Hillsdale limestone because of the "black" color and "black" chert. Also the unit may represent the St. Louis limestone. Reference: V.G.S. Bulletin 60, page 158, B.N. Cooper, 1944).
2330'	Little Valley (?) limestone  (Because there are very argillaceous black limestones present, tentatively they are called Little Valley limestone. Reference: V.G.S. Bulletin 56, page 16, P. Averitt, 1941).
4040'	Price sandstone  (Topped on appearance light gray-green shale).
4440'	Devonian (?) shales  (Topped on appearance dark gray, clay shale with small crystals of pyrite).

- 6670' Millboro shale  
(Topped on appearance, very dark gray, black, slickensided shale).
- 6685' Huntersville chert  
(Topped on appearance gray-brown, argillaceous, shaly limestone, and thick chert beds).
- 6720' Hancock (?) formation  
(Topped on appearance medium-fine to fine grained, sub-rounded, frosted sandstone).
- 6790' Clinton formation  
(Topped on appearance white and reddish-brown, iron stained, fine-to very-fine grained sandstone.)
- 6960' Clinch sandstone  
(Topped on appearance white, medium-fine grained sandstone).
- 7190' Sequatchie formation  
(Topped on appearance dark maroon and gray calcareous shale).
- 7220' T.D. samples: in Sequatchie formation

Operator: Tidewater Oil Co. and Wolf's Head  
Oil and Refining Co. (South Penn Oil Co.)

Farm: E. D. Smith

Well No: 1 (one)

Location: Scott County, Early Grove Field  
6450' S. of 36°40' approximate  
4650' E. of 82°20'

Elevation: 1456.3' Ground, 1467.5' Kelly Bushings

Total Depth: 7220' (samples); 7222' (electric log)

Commenced: September 9, 1963

Completed: February, 1964

Result: Dry hole

Geologic Log:  
Samples examined  
by Warren J. Souder,  
Virginia Division of  
Mineral Resources  
June 1965

### Geologic Rock Cuttings Log

Samples are available from 19' to 7220'.

<u>Depth</u>	<u>Thickness</u>	<u>Lithology</u>
19'-30'	11'	Contaminated
30'-130'	100'	<u>Limestone</u> , gray, very finely crystalline, dense, slightly argillaceous.  50'-80' - contaminated  90'-100' - fossiliferous  100'-110' - no sample
130'-160'	30'	<u>Limestone</u> , dark gray, very finely crystalline, dense argillaceous.
160'-180'	20'	<u>Limestone</u> , gray-brown to light-gray to whitish, finely crystalline dense.
180'-270'	90'	<u>Limestone</u> , dark gray, finely crystalline, dense, argillaceous.  210'-220' - with light gray, mottled, dense, limestone.  250'-270' - with the limestone becoming siliceous.
270'-300'	30'	<u>Limestone</u> , light gray-brown to white, very finely crystalline, dense, with some reddish mottled limestone and traces of red shale.

VDMR Well No: 951

300'-390'	90'	<u>Limestone</u> , dark gray with some dark brown tints, finely crystalline, dense, argillaceous; with some light gray to white argillaceous limestone.
390'-540'	150'	<u>Limestone</u> , gray-brown, finely crystalline, dense, argillaceous with small, brown, oolites; with an occasional tan or red, soft, calcareous shale.  460'-490' - with clear, elongate, small delicate calcite crystals; with tan, clay, soft, slightly calcareous shale.  490'-500' - with a very small amount of red shale.  510'-540' - with brown, small, lightly cemented, somewhat flattened oolites.
540'-730'	190'	<u>Limestone</u> , dark gray, finely crystalline, dense, argillaceous.  560'-570' - with limestone, gray-brown, finely crystalline, dense.  570'-580' - with some limestone, reddish mottled.  580'-590' - with a few brown, small oolites.  590'-600' - with limestone, reddish-brown, medium fine-crystalline, dense argillaceous.  610'-620' - with light gray-brown finely crystalline, dense limestone.  660'-670' - with reddish-brown, limestone, and a small amount of red shale.  (Note: Through this section there are fossils that break free from the limestone and shale, and are well preserved.)  680'-690' - with some oolites; red mottled limestone; reddish-orange shale.

		700'-710'	- with reddish orange and tan interbedded, fossiliferous shales.
730'-750'	20'		<u>Limestone</u> , reddish-brown, finely crystalline, dense, argillaceous; with interbedded reddish-orange, shale.
750'-840'	90'		<u>Limestone</u> , gray and reddish-brown, finely crystalline, dense, argillaceous, some oolites, fossils and interbedded reddish-orange shale.
840'-890'	50'		<u>Limestone</u> , dark gray, finely crystalline, dense, argillaceous.
		870'-880'	- with bright red and yellow shale, delicate calcite crystals, fossils.
		880'-890'	- with a few oolites.
890'-1020'	130'		<u>Limestone</u> , gray to brown, mottled, medium crystalline, dense; with bright red, yellow, and reddish-brown interbedded shale and many delicate calcite crystals and fossils.
		940'-1020'	- with an increase in reddish-brown, mottled limestone.
		970'-980'	- with a few oolites.
		990'-1020'	- with a decrease in shale and calcite crystals.
1020'-1430'	410'		<u>Limestone</u> , gray to dark gray, medium-to fine-crystalline, dense, slightly argillaceous.
		1130'-1170'	- with gray-brown, medium-to fine-crystalline, dense, argillaceous limestone, in varying amounts.
		1250'-1280'	- with some contamination by cement.
		1260'-1280'	- with granular calcarinites, no visible porosity.

VDMR Well No: 951

1330'-1340' - with traces of calcarinites.

1340'-1350' - with a few calcite veinings.

1380'-1390' - with limestone, dark gray-brown, mottled, coarsely crystalline, crinoidal and other fossils.

1420'-1430' - with slight silicification and some dark brown chert.

1430'-1460'	30'	<u>Limestone</u> , dark-gray, light-gray to whitish, mottled, medium-to coarsely crystalline, slightly silicified, very small amount of visible crystalline and vugular porosity, in part argillaceous, some chert that is a complete silicification of the limestone.
1460'-1510'	50'	<u>Limestone</u> , dark-gray, light-gray, mottled, medium crystalline, dense, argillaceous.
1510'-1550'	40'	<u>Limestone</u> , gray-brown, coarse-to medium crystalline, fossiliferous, slightly oolitic, argillaceous, with a small amount of visible crystalline porosity.
1550'-1670'	120'	<u>Limestone</u> , dark-gray, finely crystalline, argillaceous, dense.  1590'-1670' - with an increase in argillaceous materials.
1670'-1700'	30'	<u>Limestone</u> , gray-brown, light-gray, mottled, coarse-to medium crystalline, fossiliferous, slightly argillaceous, no visible porosity.
1700'-1760'	60'	<u>Limestone</u> , gray and light-gray, slightly mottled, medium crystalline, granular, dolomitic, in part argillaceous, no visible porosity.
1760'-1800'	40'	<u>Limestone</u> , dark-gray, medium crystalline, partially granular and dolomitic, argillaceous.

1800'-1820'	20'	<u>Limestone</u> , gray-to light-gray and whitish, mottled, with traces of reddish-brown, mottled, coarse-to medium crystalline, slightly oolitic and fossiliferous.
1820'-1840'	20'	<u>Limestone</u> , gray and reddish-brown, finely crystalline, dense, argillaceous.
1840'-1860'	20'	<u>Limestone</u> , gray and light-gray, medium-to fine crystalline, dense, argillaceous.
1860'-1900'	40'	<u>Limestone</u> , gray-brown-to whitish, finely crystalline, dense, argillaceous.  1860'-1900' - with coarsely crystalline limestone, slightly siliceous, with some brown chert and a few pyrite crystals.
1900'-2000'	100'	<u>Limestone</u> , gray and reddish-brown, finely crystalline, dense, argillaceous, with some brown chert.  1930'-1940' - with more gray-brown than reddish-brown limestone.  1940'-2000' - with predominantly gray limestone.
2000'-2110'	110'	<u>Limestone</u> , gray-to light gray-brown, medium-to coarsely crystalline, slightly oolitic, fossiliferous, with calcite crystals, some silicification and brown chert.  2030'-2050' - with a trace of glauconite.  2060'-2080' - with dark-gray, finely crystalline, dense, argillaceous limestone.
2110'-2170'	60'	<u>Limestone</u> , gray-to dark gray, brown, finely crystalline, dense, argillaceous; with light-gray calcareous "mudstone".  2160'-2170' - predominantly dark-gray, dense, argillaceous limestone.

2170'-2190'	20'	<p><u>Limestone</u>, light gray, light brown, whitish, medium crystalline, with calcite crystals, slightly silicified, with milky and brown chert.</p> <p>2180'-2190' - with a very slight amount of discolored reddish limestone.</p>
2190'-2200'	10'	<p><u>Limestone</u>, dark-gray, fine-to medium crystalline, dense, argillaceous.</p>
2200'-2250'	50'	<p><u>Limestone</u>, light gray-brown, whitish, with some reddish tinted, medium crystalline, oolitic, fossiliferous, argillaceous in part with scattered brown chert.</p>
2250'-2330'	80'	<p><u>Limestone</u>, dark gray and light gray, dense, argillaceous with dark gray chert.</p>
2330'-2360'	30'	<p><u>Limestone</u>, dark gray-black, medium-to fine crystalline, dense, very argillaceous.</p>
2360'-2390'	30'	<p><u>Limestone</u>, gray, gray-brown, and light gray, medium fine crystalline, slightly silicified, some brown and white chert, argillaceous.</p>
2390'-2440'	50'	<p><u>Limestone</u>, gray to dark-gray, finely crystalline, dense argillaceous.</p> <p>2420'-2440' - with light gray-brown and whitish, finely crystalline, argillaceous, limestone, some calcite veining.</p>
2440'-2590'	150'	<p><u>Limestone</u>, dark gray to black, some light gray, finely crystalline, very argillaceous, dense.</p>
2590'-2630'	40'	<p><u>Shale</u>, dull black, clay, calcareous, soft, "greasy".</p> <p>2620'-2630' - with light gray interbedded limestone.</p>



2630'-2640'	10'	<u>Limestone</u> ; dull light gray, calcarenitic; some argillaceous materials, many fine-grained clusters of white to clear dolomite crystals that are very friable (those that can be examined possess porosity).
2640'-2650'	10'	<u>Limestone</u> , black, very fine-crystalline, dense, very argillaceous (almost a shale).
2650'-2660'	10'	<u>Limestone</u> , dull light gray, calcarenitic and argillaceous in part with white dolomite crystals. There is porosity in the dolomite crystals but not so many crystals as at 2640'-2650'.
2660'-2690'	30'	<u>Shale</u> , dull black, slightly calcareous, soft.
2690'-2710'	20'	<u>Limestone</u> , dull black, finely crystalline with traces of anhydrite crystals, dense, very argillaceous.
2710'-2820'	110'	<u>Limestone</u> , gray-black, medium crystalline, slightly granular, argillaceous.  2720'-2730' - with limestone, dull reddish brown, slightly granular, argillaceous.  2750'-2790' - with dull light gray "mudstone" and finely crystalline limestone.  2790'-2820' - with dull reddish-brown, argillaceous limestone.  2810'-2820' - with a small amount of white and brown chert.
2820'-2990'	170'	<u>Limestone</u> , gray-black, finely crystalline, dense, argillaceous, with some dull light gray "mudstone", and traces of anhydrite, some chert.

VDMR Well No: 951

2840'-2850' - with granular, crystalline limestone. There is a gradual increase in granular, crystalline limestone and a decrease in argillaceous materials. This is progressive with no distinct separation.

2940'-2990' - with some dull reddish-brown limestone.

2990'-3020' 30'

Limestone, dark gray, very argillaceous, dense, with some anhydrite crystals.

3020'-3090' 70'

Limestone, gray, finely crystalline, somewhat granular, argillaceous.

3060'-3070' - with calcite crystals.

3070'-3090' - with dull reddish-brown argillaceous limestone.

3090'-3110' 20'

Limestone, light gray, finely crystalline, very argillaceous, some granularity, considerable anhydrite crystals.

3110'-3200' 90'

Limestone, dark gray to gray, finely crystalline, dense, argillaceous.

3150' circulated: - limestone, dolomitic, gray, finely crystalline, argillaceous.

3170'-3200' - with much anhydrite.

3200'-3250' 50'

Limestone, gray, finely crystalline, somewhat granular, argillaceous.

3230'-3240' - with shale, dark gray, calcareous, light gray "mudstone" and some anhydrite.

3243' circulated: - limestone, dolomitic, siliceous and very fine-grained, having limited porosity. Reported show of natural gas.

A core was cut from 3243.5' to 3252.5'.

VDMR Well No: 951

No core samples were saved.  
Reported: "recovered 4' wet,  
bleeding gas".

3243'-3250' - contaminated

3250'-3760'

510'

Limestone, gray, finely crystalline, somewhat granular, argillaceous, with some thin zones of granular dolomite and thin interbedded, black, calcareous shale.

3320'-3340' - with some anhydrite.

3360'-3370' - with some dull reddish-brown, argillaceous limestone.

3390'-3410' - with an increase in granular fine-grained dolomite, limited porosity, and some anhydrite.

3420'-3470' - with an increase in argillaceous materials.

3470'-3500' - with some granular dolomite and anhydrite.

3500'-3510' - with dull reddish-brown, very argillaceous limestone.

3520'-3540' - with some black, clay, shale, and some anhydrite.

3540'-3570' - with an increase in granular fine-grained, friable, light gray to clear with some greenish tints, dolomite and an occasional dull reddish brown, calcareous, argillaceous "mudstone".

3570'-3610' - with an increase in argillaceous materials.

3610'-3760' - with an increase in granular dolomite with some anhydrite.

Note: Through this section there are alternating shales that are, gray-green and calcareous, reddish-brown to tan and dark-gray. There is also scattered anhydrite.

3760'-3770'

10'

Sandstone, light gray with greenish tints, fine-grained, argillaceous, slightly calcareous; shale, light gray-green, waxy, soft and limestone that is dark gray-to black, argillaceous with considerable anhydrite.

3770'-3900'

130'

Limestone, dark-gray to black, argillaceous, dense with considerable anhydrite, some pyrite and light gray to greenish, very argillaceous limestone, and waxy light green shale.

3820'-3830' - with less anhydrite.

3830'-3840' - with considerably more anhydrite.

3840'-3850' - with less anhydrite. With granular, calcarenitic dolomite, slightly siliceous.

3860'-3880' - with some brownish-to tan limestone, and granular and siliceous dolomite.

3880'-3890' - with granular and siliceous dolomite.

3900'-3980'

80'

Limestone, gray, dolomitic, calcarenitic, slightly siliceous and slightly argillaceous.

3920'-3930' - with clay, dark gray (black), carboniferous, platy shale.

3930'-3940' - with granular, reddish-brown limestone, and reddish-to tan shale.

3950'-3960' - with traces of white, milky chert.

3970'-3980' - with dark gray shale.

3980'-4010'

30'

Shale, dark gray, clay, siliceous.

4000'-4010' - with clay, light gray-green, shale.

4010'-4050'

40'

Limestone, light gray, granular, calcarenitic, siliceous with a trace of anhydrite.

4030'-4040' - with reddish-brown staining and a trace of smoky chert.

4040'-4050' - with clay, light gray-green, shale.

4050'-4440'

390'

Shale, clay, dark gray, siliceous, fairly hard.

4070'-4100' - with clay, light gray calcareous shale, and traces of anhydrite.

4100'-4120' - with glauconite.

4130'-4180' - with clay, light gray, calcareous shale.

4170'-4180' - with clay, reddish-brown shale.

4180'-4200' - with glauconite.

4210'-4220' - with an increase of clay, light gray, calcareous shale and some clay, reddish-brown shale.

4240'-4260' - with scattered clay, reddish-brown shale, and various amounts of clay, light gray shale.

4320'-4330' - with a trace of chert, clear.

4340'-4370' - with dark gray, argillaceous silt.

4360'-4380' - with scattered shale, reddish-brown clay.

4420'-4430' - scattered anhydrite.

4440'-4785'

345'

Shale, clay, dark gray, soft, with occasional small crystals of pyrite.

4515' - circulated; no change.

VDMR Well No: 951

4785'-4810'	25'	<u>Sandstone</u> , fine-to coarse-grained, some sub-rounded and frosted, porous.
4810'-4850'	40'	<u>Shale</u> , clay, dark gray, slight-to moderately siliceous.
4850'-5860'	1010'	<u>Shale</u> , clay, dark gray, soft, with an occasional crystal of pyrite.
5860'-6670'	810'	<u>Shale</u> , clay, very dark gray, soft, platy with occasional thin interbedded of dark reddish-brown, rusty, shale.
		6020'-6040' - with clay, dark, reddish-brown, rusty shale.
		6060'-6070' - with clay, light brown shale.
		6130'-6170' - no samples
		6170'-6190' - with a thin clay, light gray, calcareous shale, and a trace of pyrite.
		6200'-6220' - the shales are slightly siliceous.
		6240'-6270' - with clay, dark reddish-brown shale.
		6280'-6300' - with clay, dark reddish-brown shale.
		6350'-6370' - with clay, dark reddish-brown shale.
		6420'-6440' - with clay, very dark reddish-brown shale.
		6470'-6490' - with clay, dark reddish-brown shale.
		6510'-6540' - with trace of pyrite.
		6660'-6670' - with pyrite.
6670'-6685'	15'	<u>Shale</u> , clay, very dark-gray, black, slickensided.

6685'-6690'	5'	<u>Limestone</u> , gray-brown, argillaceous, shaley.
6690'-6700'	10'	<u>Chert, or quartzite</u> , light gray, hard.
6700'-6710'	10'	<u>Shale</u> , clay, dark gray with reddish tints.
6710'-6720'	10'	<u>Chert, or quartzite</u> , light gray, some opaque, hard.
6720'-6730'	10'	<u>Sandstone</u> , medium-fine to fine-grained, sub-rounded, frosted and porous (visible ?).
6730'-6740'	10'	<u>Shale</u> , clay, light gray-green, slightly siliceous.
6740'-6750'	10'	<u>Shale</u> , clay, dark gray, with dolomitic, siliceous and cherty limestone.
6750'-6775'	25'	<u>Shale</u> , clay, dark gray.  6760'-6775' - with clay, gray-green, siliceous shale.
6775'-6790'	15'	<u>Sandstone</u> , gray-brown to white, medium-fine-to fine, slightly calcareous.
6790'-6960'	170'	<u>Sandstone</u> , white and reddish-brown, iron stained, fine-to very-fine grained, occasionally sub-rounded, with some interbedded dark gray shales. The sandstones are fairly porous.  6820'-6830' - with dark gray shale.  6850'-6860' - with dark gray shale.  6860'-6890' - with an increase in reddish-brown iron stains.  6890'-6900' - with clay, dark gray, platy, siliceous shale.  6900'-6960' - porosity appears greater.

VDMR Well No: 951

6960'-7190'

230'

Sandstone, white, medium-fine-grained, sub-rounded, visible porosity with thin interbedded dark gray, platy, splintery shales.

6970'-6975' - no samples

6975'-6980' - with shale, dark gray, siliceous, hard.

6980'-6990' - no samples

6990'-7000' - Reaming sample.  
Sandstone, white, medium-fine, friable porous.

7185'-7190' - with dark gray, siliceous, shale.

7190'-TD 7220'

30'

Shale, dark gray, with dark maroon, siliceous and calcareous shale.

7200'-7210' - slightly calcareous.

7210'-7220'TD - increase in calcareous content.