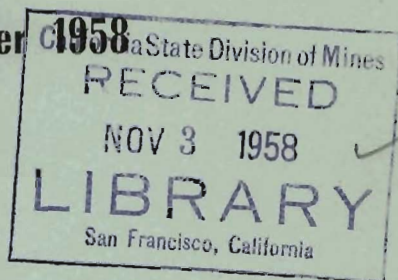


MONTHLY BULLETIN

September 1958 State Division of Mines



*Mineral
Industries Laboratory*

**1430 Devine Street
Columbia, South Carolina**

**DIVISION OF GEOLOGY
State Development Board**

**DEPARTMENT OF GEOLOGY
University of South Carolina**

STRATIGRAPHIC DATA FROM SELECTED OIL TESTS AND WATER WELLS IN THE SOUTH CAROLINA COASTAL PLAIN ¹.

By

George E. Siple ².

During recent years there has been increased interest in the potentialities of the Atlantic Coastal Plain as a source area for the accumulation of petroleum. From time to time geologists, oil scouts, promoters, and wildcat drillers have contacted the U. S. Geological Survey and the Geology Department, University of South Carolina, in reference to the geology of the South Carolina Coastal Plain. They were particularly interested in such data as might enable them to make an adequate appraisal of the potentialities for finding oil in South Carolina, before selecting any site for exploratory drilling.

In the process of evaluating these potentialities one useful category of data is that which defines the limits or boundaries beyond which drilling is most likely to be either unrewarding or unprofitable. Included in this category is the definition of total thickness of the sedimentary deposits or source beds. This is done by means of a structure-contour map showing the altitude of the buried basement rock.

The purpose of this paper is to provide information on the depth to bedrock, along with some of

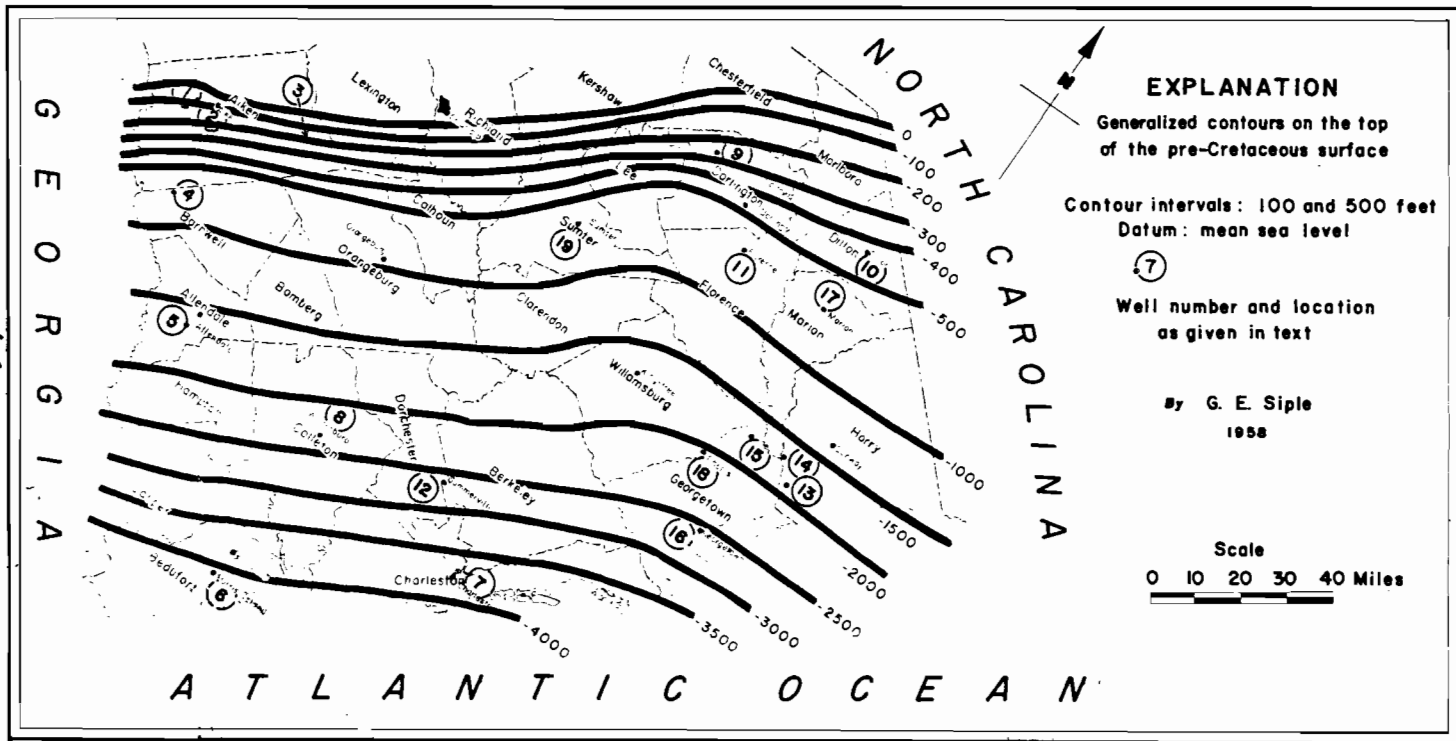
-
1. Publication authorized by the Director, U. S. Geological Survey.
 2. Geologist, U. S. Geological Survey, Columbia, S. C.

the well data obtained in previous attempts to find oil in South Carolina. Because of the required brevity of the article, there is no attempt to make either the data or the discussion on structure inclusive, and only the most important or critical data are considered.

Figure 1 is a structure map representing the surface of the buried (pre-Cretaceous) rocks. These buried rocks are supposedly an extension of the crystalline rocks of the Piedmont, considered as Paleozoic to Triassic in age. As indicated in Table 1, some of the wells used in the preparation of the map have bottomed in Triassic rocks rather than in the granite, schist, or gneiss of Paleozoic age; both the Paleozoic crystalline rocks and the Triassic sedimentary rocks and diabase have been treated as one unit in plotting basement altitudes on the map.

The most prominent structural feature of the buried basement rocks is the Great Carolina ridge, or Cape Fear arch. This ridge is an anticlinal arch whose axis is roughly parallel to the Cape Fear River in North Carolina and the nearby North Carolina -- South Carolina State line. Spangler (1950, p. 132) describes the arch as a wide nose plunging to the southeast at approximately 15 feet per mile. The formation of the Cape Fear arch or uplift was accompanied by downwarping on the flanks.

Inliers, or "windows," of basement rock have been observed in stream valleys near the Fall Line, where the basement rock has been exposed by removal of overlying Coastal Plain sediments. However, the presence of buried hills of basement rock, similar to that found at Fountain, N. C., has never



Generalized structure-contour map of the South Carolina Coastal Plain.

been confirmed in South Carolina. Some suggestion of similar structure is found where buried Triassic highs were suspected, as for example in the Summerville area.

Additional structural features of the basement rock include suggested basins in the Savannah River valley, Santee River valley, and Beaufort area.

More intensive drilling in the North Carolina Coastal Plain has demonstrated a break in slope in the basement rock, there being a decided increase in slope beyond the -2,500-foot basement contour.

Prouty (1946) believed that the more gently sloping plane above -2,500 feet represented the Schooley peneplane and the steeper slope, the Fall Zone peneplane. Possibly a similar increase in slope exists beneath the South Carolina Coastal Plain, but to date no well has been drilled to basement beyond the -2,500-foot contour.

No naturally occurring oil or gas has ever been produced in South Carolina, and many geologists have expressed considerable doubt as to the possibilities of ever finding any. Nonetheless, with the development of more modern and advanced drilling techniques, the additional advantages of offshore drilling, and the present political-economic situation, there is a favorable inclination on the part of some interested parties to reconsider the possibilities of oil resources in South Carolina and elsewhere in the Atlantic Coastal Plain. Considerable emphasis is given to the thought that additional exploratory drilling is reasonably justified in order to obtain more exacting data, without which the area cannot be written off as entirely lacking in potential.

The included data on past drilling activities is offered as a brief resume of the situation to date in the South Carolina section of the Coastal Plain. Perhaps sufficient interest will one day result in additional test wells which should provide answers to many of the questions that are now unresolved.

References

- Prouty, W. F., 1946, Atlantic Coastal Plain floor and continental slope in North Carolina: Am. Assoc. Petroleum Geologists Bull., v. 30, p. 1917-20.
- Richards, H. G., 1945, Subsurface stratigraphy of Atlantic Coastal Plain between New Jersey and Georgia: Am. Assoc. Petroleum Geologists Bull., v. 29, p. 885-955.

Table 1.--Selected oil tests and water wells in the South Carolina Coastal Plain

Well No.	Well type or name	Location	Drilling company	Total depth (feet)	Oldest rock or formation recognized	Depth to basement rock (feet)	Approximate Altitude (feet)	Remarks
1	Oil test	5 mi. SW. of Aiken	Survey Drilling Co.	492	"Granite"	365	-50	Drilled Feb. 1957
2	Water well	City of Aiken	-----	560	Do	465(?)	+67(?)	Drilled prior to 1896
3	Oil test	Between Perry and Wagner	-----	1,000	Do	642	-192	Drilled Jan. 1950
4	Water well	Savannah River Proj.-Aiken County	Layne-Atlantic Co.	1,185	Chlorite-hornblende schist	999	-696	Drilled Jan. 1952
5	Oil test	4 mi. S. of Allendale	South Central Oil Co.	200 [±]	Tertiary sands(?)	X	X	Drilled Apr. 1947
6	Water well	Parris Island, Beaufort County	Layne-Atlantic Co.	3,454	Tuscaloosa formation(nonmarine)	X	X	Drilled 1942
7	Do	City of Charleston	-----	2,015	Black Creek formation	X	X	-----
8	Do	City of Walterboro	-----	1,500	Do	X	X	-----
9	Do	City of Hartsville	Layne-Atlantic Co.	432	Schist	428	-258	-----
10	Do	City of Dillon	Carolina Drill. & Equip. Co.	595	Rhyolite breccia	594	-480	Core taken of basement rock

Table 1.--Selected oil tests and water wells in the South Carolina Coastal Plain
Continued

Well No.	Well type or name	Location	Drilling company	Total depth (feet)	Oldest rock or formation recognized	Depth to basement rock (feet)	Approximate altitude (feet)	Remarks
11	Water well	City of Florence	Carolina Drill. & Equip. Co.	715	Olivine diabase of Triassic(?) age	710	-602	Core taken of basement rock
12	Oil test	Near Summerville	-----	2,470	"Basement rock"	2,450	-2,379	Drilled prior to 1936
13	Fannie Collins oil test	12 mi. SW. of Conway	A. B. Cruse	1,440	Tuscaloosa formation or other rocks of pre-Austin age.	X	X	Drilled 1947
14	Smart Farm oil test	12 mi. SW. of Conway	Pioneer Oil Co.	1,429	Basement(?)	1,429	1,393	After Richards (1945)
15	Lee Williams No.1 oil test	28 mi. N. of Georgetown	Southern States Drilling Co.	1,397	Tuscaloosa formation	X	X	Do
16	Water well	City of Georgetown	Layne-Atlantic Co.	1,870	Tuscaloosa fm. or other rocks of pre-Austin age	X	X	Drilling very hard on bottom
17	Do	City of Marion	-----	1,244	Crystalline schist	700	-632	Drilled prior to 1896
18	Oil test	Near Rhems, Williamsburg County	Southern States Drilling Co.	825	Black Creek formation	X	X	After Richards (1945)
19	Water well	City of Sumter	Layne-Atlantic Co.	784	"Granite"	782	-620	Drilled in 1952

X=basement not reached

