

Operator: Southwestern Oil and Gas Company
 Farm: Hagan
 Well No.: 3
 Location: Wise County
 7500' (?) S. of 36°55') approximate
 500' (?) E. of 82°30')
 Elevation: 2600'
 Total Depth: 5348'
 Drilling Commenced: March 1, 1941
 Well Completed: 1942
 Result: Dry hole (See remarks)

Samples (0'-1583') examined
 by Allen D. Williamson,
 U. S. Geological Survey
 Lexington, Kentucky
 March, 1950

GEOLOGIC LOG

<u>Depth Interval</u>	<u>Lithology</u>
0- 50	No sample.
50- 105	Sandstone, very light gray (N8), very fine-grained to fine-grained, subangular to subrounded, grains milky, micaceous; and shale, dark gray (N3), with some coal.
105- 114	Shale, dark gray (N3), fissile, finely micaceous.
114- 117	Coal, vitrain and clarain (?).
117- 135	Sandstone, light gray (N7), fine-grained, silty cement, micaceous, with abundant black mineral and brown mineral (siderite?).
135- 195	Siltstone, medium dark gray (N4), micaceous, sandy; and shale, dark gray (N3), fissile.
195- 207	Sandstone, light gray (N7), fine-grained to medium-grained, very micaceous with little black mineral and abundant brown mineral (siderite).
207- 210	Coal, vitrain (?).
210- 258	Sandstone, medium light gray (N6), fine-grained, subangular, micaceous, with little black mineral.
258- 269	Sandstone, light gray (N7), very fine-grained to medium-grained, subangular, micaceous, abundant black mineral and little green mineral.
269- 278	Shale, medium dark gray (N4), very micaceous, fissile; and shale, brownish gray (5YR 4/1), very sideritic.
278- 281	Coal, impure.

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- 281- 415 Sandstone, light gray (N7), fine-grained to medium-grained, subangular, scattered black mineral; sandstone, medium light gray (N6), very fine-grained to fine-grained, subangular, calcareous; siltstone, medium gray (N5), micaceous, sideritic; little shale, very dark red (5R 2/6); and little coal (cavings?).
- 370 Sandstone, white (N9), fine-grained to medium-grained, with few coarse grains, subangular to subrounded, clear grains, porous, with little black mineral.
- 380 Sandstone, like 370.
- 415- 419 Coal.
- 419- 482 Sandstone, very light gray (N8), fine-grained to medium-grained, with abundant coarse-grained, and quartz pebble chips, subangular to subrounded, grains mostly but some coarse milky grains, scattered black mineral, and some limonitic stain.
- 482- 500 Shale, dark gray (N3) to grayish black (N2), finely micaceous, fissile, with little coal.
- 500- 530 Siltstone, medium gray (N5) to medium light gray (N6), micaceous, sandy, with sideritic nodules.
- 530- 640 Sandstone, medium light gray (N6), fine-grained, subangular, slightly micaceous with little black mineral, and little green mineral.
- 640- 650 Sandstone, medium gray (N5), very fine-grained to fine-grained, subangular, poorly sorted, contains abundant mica, black mineral, and silty impurities, slightly calcareous, 60% quartzose.
- 650- 760 Sandstone, very light gray (N8), very fine-grained, to fine-grained, subangular with few round grains, friable, grains clear to milky, little black mineral, and fairly abundant green mineral.
- 760- 770 Siltstone, medium dark gray (N4), fine, slightly micaceous; and siltstone, dark greenish gray (5G 6/1), sandy to shaly.
- 770- 771 Shale, dusky red (5R 3/4) silty, micaceous; and shale, grayish red (10R 4/2) sideritic.
- 771- 785 Shale, dusky red, and grayish red, like 770-771 with some greenish gray (5GY 6/1), very fine-grained sandstone.

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- 785- 802 Siltstone, greenish gray (5G 6/1), slightly calcareous, (sample consists of unconsolidated silt. May be contamination from above).
- 802- 817 Shale, dark gray (N3), micaceous, calcareous.
- 817- 820 Shale, dark gray (N3), micaceous, calcareous.
- 820- 840 Siltstone, greenish gray (5GY 6/1), very calcareous.
- 840- 858 Siltstone, grayish red (10R 4/2), very sandy, very calcareous, (calcite clusters), abundant white to yellowish chert.
- 858- 885 Sandstone, pale yellowish brown (10YR 6/2), very fine-grained (silty), subangular, calcareous, micaceous, abundant limonitic, stain.
- 885- 913 Limestone, greenish gray (5G 6/1), silty; and limestone, dusky red (5R 3/4), silty, sugary, both grade into greenish gray and dusky red slightly calcareous siltstone.
- 913- 922 Siltstone, dark greenish gray (5G 6/1), very micaceous, calcareous.
- 922- 935 Shale, dark gray (N3), silty, micaceous; and shale, dusky red (5R 3/4), micaceous, some very calcareous.
- 935- 955 Siltstone, dark greenish gray (5GY 4/1) and dusky red (5R 3/4), micaceous, some sideritic, some very calcareous zones, (possibly mottled).
- 955- 967 Shale, dusky red (5R 3/4), sideritic, 50% is very calcareous, 50% non-calcareous.
- 967-1018 Sandstone, light greenish gray (5G 8/1), fine-grained, subangular to subrounded, thin-bedded, platy, slightly micaceous, abundant green mineral and little black mineral.
- 1018-1031 Shale, greenish black (5GY 2/1) to brownish gray (5YR 4/1), brownish phase sideritic.
- 1031-1070 Sandstone, light gray (N7), very fine-grained to fine-grained, subangular, poorly sorted, silty, micaceous, scattered black mineral; siltstone, medium dark gray (N4), micaceous, calcareous, sandy.
- 1070-1087 Siltstone, like 1031-1070; and shale, dark gray (N3), silty, very micaceous.

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- 1087-1195 Siltstone, medium dark gray (N4), non-calcareous, fine, micaceous to sandy, quartzose.
- 1195-1237 Sandstone, light gray (N7), calcareous to medium gray (N5), non-calcareous, fine-grained, subangular, platy, micaceous, abundant black mineral.
- 1237-1322 Shale, dark gray (N3), fissile, finely micaceous, slightly calcareous.
- 1322-1350 Shale, dark gray (N3), very calcareous, micaceous.
- 1350-1390 Sandstone, very light gray (N8), very fine-grained to fine-grained, subangular to subrounded, fairly well sorted, slightly porous, calcareous, little black mineral and green mineral, 3/4 quartzose.
- 1390-1392 Shale, dark gray (N3), lumpy, finely micaceous.
- 1392-1416 Sandstone, light gray (N7), conglomeratic, fine-grained to medium-grained with abundant pebble chips, subangular to subrounded, (granules and pebbles well rounded), fairly well sorted, fairly porous, calcareous, little black mineral and little green mineral, 90% quartzose.
- 1416-1452 Shale, dark gray (N3), fissile, calcareous with some limestone, dark gray (N3), silty.
- 1452-1460 Sandstone, very light gray (N8), very fine-grained, subangular, fairly well sorted, very slightly porous, calcareous, micaceous with scattered zones of black mineral, 3/4 quartzose.
- 1460-1462 Shale, grayish black (N2).
- 1462-1495 Sandstone, very light gray (N8), very fine-grained, angular to subangular, platy, poorly sorted, very slightly porous, scattered black mineral and mica, 90% quartzose.
- 1495-1519 Sandstone, like 1462-1495; and shale, dark gray (N3), silty, micaceous, fairly fissile, (interbedded).
- 1519-1566 Sandstone, white (N9), very fine-grained to fine-grained, well sorted, porous, friable, clear grains, abundant limonitic stain, 95% quartzose.
- 1566-1583 Limestone, dark gray (N3), silty, (sample contaminated by overlying lithologies).

(Bottom).

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- Remarks: Drilling started March 1, 1941, Gas from well No. 1 on Hagan lease used for fuel - Fresh water encountered at 55'.
- March 3 - 86'.
- March 10 - 335'.
- March 17 - 542' - Fresh water encountered at 380'.
- March 24 - 723' - During the entire week in hard sandstone - apparently basal member of the Lee conglomerate. As of March 21st, 373,740 cubic feet of gas had been used from Hagan No. 1 for drilling of Well No. 3 - gas pressure at No. 1 = 400 lb.
- March 31 - Hard sandstone mentioned on 24th penetrated on 27th of March. 30 and 31st in Red Rock which is soft, etc. 31st = 851'.
- April 7 - 1080'.
- April 14 - Sandstone encountered at 1452'. When drilling discontinued at 1458' or 6' in the sand, well was making a small amount of gas. The first gas encountered in Hagan No. 1 was 25' in the sand.
- April 21 - 1580' - sandstone of April 14th penetrated at 1566' then in limestone. Drilling stopped pending decision as to additional depth. Not enough gas to measure or light.
- April 28 - 1583' - Drilling stopped on April 22 when the limestone had been penetrated 17'.
- (Mr. Moore still took notes on this well even though run by United Carbon.)
- July 14 - 1730' - Red shale was encountered as soon as drilling was resumed.
- July 21 - 1830' - Red shale penetrated on July 17th at 1765'. Drilling since then has been in hard sandstone.

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- July 28 - 2016' - The bottom bed of sandstone in the Pennington formation was encountered at 1940'. This sandstone was 224' thick in Hagan Well No. 1. No gas was encountered in this sandstone in Well No. 1. At 2012' a show of gas was encountered and another at 2015'. The driller estimated the volume at 10,000 cubic feet. Based on the log of No. 1 well, there should be 152' more of sandstone in this bed.
- Aug. 4 - 2195' - Thickness of sandstone (Pennsylvanian basal member) = 255'. Penetrated at 2195'.
- Aug. 11 - From 2195' to 2532' in slate, 2532 to 2550 limestone. At 2525' a caving formation was encountered.
- Aug. 18 - 2705' - At 2677' show of gas encountered in limestone.
- Sept. 1 - At noon Sept. 5, T. D. = 2800' - Hard limestone has been encountered.
- Sept. 8 - 2875' - As of noon drilling in hard limestone.
- Sept. 15 - 3080' - Drilling entire week in limestone.
- Sept. 22 - 3235' - The base of the Mississippian limestone(?) was penetrated at 3232'. At noon today drilling is in dark hard sandstone.
- Sept. 29 - 3365' - Drilling during entire week has been in the Price sandstone.
- Oct. 6 - 3817' - The Price sandstone was penetrated at 3370'. The drilling from 3370' to 3800' was in the Big Stone Gap shale. At 3800' the Berea sandstone was encountered.
- Oct. 13 - 4145' - Berea sandstone penetrated at 3840'. Gritty limestone and shells encountered from 3840' to 3915'. From 3915' the drilling has been in gray shale of Portage age. A gas show at 4035' and again at 4045'.
- Oct. 20 - 4650' - The drilling this week (entirely) has been in gray and dark shale. The black carbonaceous shale of Genessee age apparently has not been encountered to date.

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- Oct. 27 - 4950' - Black carbonaceous shale of the Genessee age was encountered at 4770'. At 4943' sandstone was encountered.
- Nov. 10 - 5050' - The drilling from 4943' has been in the Helderberg limestone. The thick bed of sandstone which was supposed to be encountered under Genessee shale hasn't been encountered to date.
- Nov. 17 - 5150' - Drilling all week apparently in limestone formation.
- Nov. 24 - 5200' - Shale caving badly.
- Dec. 1 - 5250' - Shale and slate caved until sandstone penetrated at 5235'.
- Dec. 8 - 5277' - Extremely hard sandstone from 5235'. Think it is the Oriskany of West Virginia. Now 52' into the sandstone.
- Dec. 15 - 5340' - Very hard sandstone mentioned in last week's report was penetrated on the 12th at the depth of 5294'. Total thickness of the sandstone was 59' - thought they got a show of gas in this sand.
- Dec. 22 - 5348' - Drilling discontinued - last 37' through slate and shell. Hole filled with rock to approximately 5000'.
- Jan. 12 - Shale encountered from 4000' to 5000' was shot with 100 ten foot shells of gellatin. Well made 39,000 cubic feet of gas through a 1" opening.

Wise Co. 275

SOUTHWESTERN OIL AND GAS COMPANY SAMPLES
(Hagan No. 3)
Well No. 3, on Ramsey Creek, Wise County, Virginia

- Interval (Unless otherwise indicated, only one (1) sample was available for each interval.)
- 0- 50 No samples.
- 50-105 Sandstone and shale. Sandstone, white and light-gray, very fine to fine subangular grains. Shale, black and dark gray, non-calcareous. Micaceous and scattered black mineral.
- 105-114 Shale, black, with some dark gray very fine-grained micaceous shaly sandstone. May be contaminated.
- 114-117 Coal -- good sample.
- 117-135 Sandstone, light gray, very fine-grained, scattered black mineral, micaceous, subangular grains. Some flat small black shale pebbles, non-calcareous.
- 135-195 Shale, dark gray, sandy, micaceous, scattered black mineral, non-calcareous.
- 195-207 Sandstone, light to medium gray, fine subangular grains, breaks in clusters, scattered black mineral, micaceous, non-calcareous.
- 207-210 Coal and sandstone (probably contaminated from overlying sandstone).
- 210-258 Sandstone, medium gray, very fine to fine subangular grains, micaceous, scattered black minerals, breaks in clusters.
- 258-269 Sandstone, light gray, fine subangular grains, micaceous, scattered black mineral. Some sandstone is white.
- 269-278 Shale, medium gray, sandy; or sandstone, shaly, very fine-grained, micaceous, slightly calcareous.
- 278-281 Coal, impure, has siliceous content.
- 281-415 Sandstone, dark gray (probably shaly), soft in part, micaceous, black shaly pieces. Some sandstone is white, not angular, scattered black mineral.

Interval

- 370' Sandstone, white, quartzose, fine subangular grains, scattered black minerals, water-bearing.
- 380' Sandstone, same as at 370' except very fine-grained.
- 415-419 Coal -- good sample.
- 419-482 Sandstone, light gray, fairly quartzose, fine subangular grains, micaceous, some yellow-brown interstitial material.
- 482-500 Shale, dark gray, sandy, micaceous.
- 500-530 Shale, dark gray, scattered black minerals, micaceous, sandy.
- 530-640 Sandstone, light gray, varies greatly in grain size, contains scattered black mineral, micaceous, breaks in clusters.
- 640-650 Sandstone, medium gray, quartz is white, sub-angular, very fine grained, abundant black scattered minerals.
- 650-760 Sandstone, light gray, very fine angular to subangular grains, abundant scattered black mineral and limonitic staining on surface of some quartz.
- 760-770 Sandstone, medium gray, some grains have slight greenish tint, very fine sub-angular grains, abundant black minerals, and yellow-brown interstitial material.
- 770-771 Sandstone, brownish-red, light green, grayish green, silty, micaceous, shaly, non-calcareous.
- 771-785 Sandstone, silty, greenish gray, brownish red, very fine grained, (shaly?) micaceous, non-calcareous, (sample labeled gray and green limestone).
- 785-802 Siltstone, greenish gray, slightly sandy, micaceous, non-calcareous, (labeled green limestone).
- 802-817 Shale, dark gray, slight reddish tint locally, micaceous, slightly calcareous.
- 817-820 Shale, dark gray, micaceous, very calcareous
- 820-840 Shale, calcareous or limestone, shaly, dark gray, very "powdery", (probably limestone).

Interval

- 840-858 Siltstone, reddish brown, noted calcite clusters, quite calcareous.
- 858-885 Limestone, silty or siltstone, calcareous, brown with slight reddish yellow tint, contains scattered black mineral, has gritty feel.
- 885-913 Limestone, dark gray and hematitic red, has "sugary" appearance.
- 913-922 Shale, dark gray, slightly calcareous, looks like limestone under microscope, but does not effervesce freely.
- 922-935 Shale, dark gray and hematitic red, calcareous.
- 935-955 Shale, gray with greenish tint or hematitic red, very calcareous (could be a shaly limestone).
- 955-967 Shale, hematitic red, slight greenish gray mottling locally, very calcareous.
- 967-1018 Sandstone, light gray, fine sub-angular grains. Evidently contaminated by overlying calcareous lithology. Contains scattered black minerals and occurs in sample as clusters of quartz grains, calcareous (cement is probably calcareous).
- 1018-1031 Shale, medium to dark gray, slightly calcareous locally.
- 1031-1070 Siltstone, dark gray, very calcareous, slightly sandy.
- 1070-1087 Shale, dark gray, slightly calcareous.
- 1087-1195 Shale, dark gray.
- 1195-1237 Sandstone dark gray, quartz is white, forms in hard clusters, slightly calcareous, (matrix probably calcareous), micaceous.
- 1237-1322 Shale, dark gray, finely micaceous, non-calcareous.
- 1322-1350 Limestone, shaly impure or shale, somewhat calcareous, dark gray, "sugary" appearance under microscope.
- 1350-1390 Sandstone, light gray, sub-angular fine grains, quartzose, contains yellow-brown material, scattered black minerals, is in clusters, calcareous (probably cement is calcareous).

Interval

- 1390-1392 Shale, dark gray, contaminated with some of overlying lithologies, non-calcareous.
- 1392-1416 Sandstone, light gray, fine angular to sub-angular grains, limonitic staining locally, scattered black minerals, (shows some contamination?), calcareous in part.
- 1416-1452 Shale, dark gray, or limestone, shaly.
- 1452-1460 Sandstone, light gray, very fine grained with some dark gray shale, is in clusters, contains scattered black minerals.
- 1460-1462 Shale, black and dark gray and shale, light gray, sandy, micaceous, very slightly calcareous.
- 1462-1495 Sandstone, light gray-white, quartzose and quartzitic, very fine sub-rounded to sub-angular grains, cemented together in clusters, has scattered black minerals and some limonitic yellow-brown staining, non-calcareous.
- 1495-1519 Sandstone and shale (probably interbedded), sandstone is same as in overlying unit. Shale is dark gray, very slightly calcareous.
- 1519-1566 Sandstone, white, very fine to fine, sub-angular grains, scattered black minerals, quartzose, limonitic yellow-brown staining present, non-calcareous.
- 1566-1583 Limestone, dark gray, appears shaly, "sugary," (Evidently contaminated by overlying lithology somewhat). Emits gaseous odor when dilute HCl is applied.