

Operator: United Producing Company, Inc.  
 Farm: Yukon Pocahontas Coal Co., et al  
 Well No.: 51647  
 Location: Buchanan County  
           10,600' S of 37°15' )  
           9,000' E of 82°00' ) approximate  
 Elevation: 1826.4' Ground  
 Total Depth: 4358'  
 Drilling Commenced: September 1, 1949  
 Well Completed: January 19, 1950  
 Result: Gas well  
 Geologic log and summary of Pennsylvanian section by Marshall S. Miller,  
 September 1970.

This well has been logged by David Bowen (VPI) and John Huddle (USGS). After studying their logs, and briefly reviewing the well cuttings, I decided to relog the entire Pennsylvanian section. The logs of Bowen and Huddle are not very consistent and agreeable with each other. This is mainly due to (1) the use of the term "mudstone" by Huddle, who applies the term very loosely, and (2) disagreement between Bowen and Huddle as to the identification of "siltstone". In order to remain consistent with previously logged wells, a geologic log has been prepared and descriptions follow below.

This well also provides an excellent section of the Post Lee strata; a massive basal Lee sandstone; and a well identifiable unconformity between the Pocahontas and Lee formations; and a good recognizable boundary between Pocahontas and Bluestone formations.

Interval	Thick- ness	Description
0- 15	15'	Sandstone, yellowish orange, due to weathering, very fine to medium grained, very silty, loose and friable, subround, feldspathic, slightly micaceous with abundant dark minerals and several large loose pebbles
15- 26	11'	Siltstone, gray, shaly, micaceous
26- 99	73'	Shale, gray, micaceous, locally silty (56-99), locally carbonaceous (61-77)

- 99-101 2' Coal, dull to vitreous luster, blocky and irregular fracture, pure mostly
- 101-122 21' Sandstone, white to light gray, fine to medium grained, subangular, poorly sorted with scattered muscovite flakes, coal and dark argillaceous material, chlorite, fair porosity in upper 18', silica cementing increases downward. About 70-80% quartz, medium to coarse grained, and more rounded by 116', also picks up more minerals, more micas including phlogopite, rounded green pebbles, but doubtful if glauconite as Bowen suggests, considerable amount of coal throughout
- 122-138 16' Sandstone, much like that above, only very silty throughout, appears loose, friable, again with fair porosity
- 138-174 36' Sandstone, white to light gray, medium to coarse grained and occasionally conglomeratic, subangular to sub-round, interstitially silty, continued poorly sorted with large granules of quartz, and lesser but abundant amounts of coal, dark argillaceous material, feldspar, chloritic grains, and abundant muscovite and chlorite. \*A crude, "rugged" looking sand. Poor to fair porosity. Clay and silica cement throughout, but degree of cementing varies
- 174-184 10' Shale, dark gray, silty, micaceous with occasional ironstone
- 184-210 24' Siltstone, gray, siliceous, locally carbonaceous, grain size increases downward, becomes of very fine grained sand by 190' with occasional large and rounded quartz grains. However remains a very silty interval.
- 210-319 109' Sandstone, white, to light gray, mostly medium grained but occasionally fine and coarse grained, subangular to subround, generally poorly sorted, with abundant micas (chlorite, muscovite and biotite) and carbonaceous material, appears loose, fair porosity, but degree to cementing varies throughout interval, interstitially silty, clay and silica cement. Becomes coarse grained and slightly conglomeratic (268'-279'). Is very fine grained to medium grained, loose and silty (279'-300'). Becomes medium to coarse grained and conglomeratic, very little silt and clay material, and contains some interbedded, dark gray, micaceous shale (300-311). Returns to a fine grained, silty, loose sand (311-319)

319-342	23'	Shale, gray, silty, micaceous, locally carbonaceous
342-347	5'	Sandstone, light gray, very fine grained, moderate sorting, subrounded, with abundant muscovite, biotite and other reddish and dark minerals
347-361	14'	Interbedded, sandstone and siltstone, siltstone (347-353) (359-361) gray, siliceous, micaceous and carbonaceous. Sandstone (353-359) like previous sand interval
361-388	27'	Siltstone, like that above, grades downward to a silty shale
388-433	45'	Shale, dark gray, finely micaceous, silty with some scattered ironstone
433-458	25'	Sandstone, light gray, fine to medium grained, subangular, poorly sorted. about 50-60% quartz, has abundant muscovite, biotite, chlorite, carbonaceous material, hematite, limonite, and feldspar, poor porosity
458-471	13'	Shale, dark gray, finely micaceous
471-488	17'	Sandstone, light gray to light tan, fine to medium grained, subangular, poorly sorted, micaceous, feldspathic, with abundant clay, silty, and dark argillaceous material
488-507	19'	Sandstone, white, medium grained, subangular with little clay and silt material, otherwise like that sand above. Also some interbedded shale
507-510	3'	Coal, good show of coal, 1 to 10 mm in length, dull to bright luster, irregular fracture
510-547	37'	Siltstone, gray, siliceous, micaceous, and argillaceous
547-562	15'	Shales, gray, finely micaceous, with occasional ironstone
562-595	33'	Sandstone, light gray, fine to medium grained, subangular, poorly sorted, micaceous, with abundant coaly material, and dark argillaceous material, poor porosity

595-605	10'	Siltstone, gray, micaceous, locally carbonaceous
605-669	64'	Shale, dark gray, micaceous, silty
669-730	61'	Sandstone, white to gray, fine grained, subangular, poorly sorted, with coal, muscovite, biotite, and red and dark minerals, poor to fair porosity
730-738	8'	Interbedded sandstone and siltstone: sand like that above
738-830	92'	Shale, dark gray, silty
830-865	35'	Sandstone, light gray-light tan, very fine grained, silty, moderately sorted, micaceous, with abundant dark minerals, and coaly laminations, no porosity
865-883	18'	Interbedded; sandstone and shale; sand continues like that above; shale is dark gray, micaceous
883-932	49'	Siltstone, gray, micaceous, argillaceous with scattered ironstone nodules, occasionally siliceous, grades downward to a fine grained silty sand
932-937	5'	Sandstone, light tan, very fine grained, silty
937-950	13'	Siltstone, like previous interval, more shaly, locally carbonaceous, grades downward to a silty shale
950-1001	51'	Shale, gray, micaceous, silty locally carbonaceous, some ironstone laminations
1001-1011	10'	Siltstone, gray micaceous, shaly
1011-1028	17'	Sandstone, light gray, fine to medium grained, micaceous, subangular, poorly sorted, micaceous, feldspathic, and coaly material
1028-1030	2'	Coal, dull to vitreous luster, silty, thickness from drillers log
1030-1054	24'	Shale, dark gray, micaceous, silty with interbedded siltstone

1054-1109	55'	Sandstone, light gray to light tan, fine to medium grained, subangular, poorly sorted, with abundant muscovite, and dark carbonaceous and argillaceous material and reddish iron minerals, no porosity. Becomes interbedded with a dark gray siltstone at 1071'-1092
1109-1202	93'	Shale, gray, micaceous
1202-1208	6'	Coal, good show of coal, dull to high luster, pure and impure, with abundant fossil rootlets, depth and thickness from drillers log
1208-1231	23'	Shale, mostly, dark gray, micaceous, locally carbonaceous with lesser amounts of sand and silt in upper 10'
1231-1245	14'	Interbedded; sandstone and siltstone; sand is white, light gray, fine grained, micaceous
1245-1272	27'	Sandstone, light gray, fine grained, subangular, poorly sorted, with abundant muscovite, biotite, chlorite, carbonaceous material, and yellow iron stains, no porosity, interstitially silty
1272-1291	19'	Shale, gray, silty, micaceous, with occasional ironstone and coal. Possibly a 1' coal interval present in interval (1281-1291)
1291-1340	49'	Sandstone, light gray, buff, moderately sorted, fine grained, subangular, with abundant but scattered muscovite, biotite and coaly laminations. No porosity
1340-1383	43'	Shale gray, silty, micaceous, locally carbonaceous
1383-1391	8'	No sample
1391-1398	7'	Interbedded; shale, like that above and sandstone, much like previous sand interval
1398-1405	7'	Sandstone, light gray, fine grained, subangular, poorly sorted, with abundant muscovite, biotite, carbonaceous material, chlorite, and siderite and limonite

- 1405-1492 87' Shale, dark gray, locally carbonaceous, generally micaceous
- 1492-1510 18' Interbedded; sandstone and shale: shale like that above; sand is light gray, fine grained, silty, subangular, slightly micaceous and feldspathic, no porosity, abundant iron staining throughout
- \*1510-1513 13' Sandstone, white, fine grained, quartzose, subangular, moderately well sorted, almost entirely pure quartz. This represents the beginning of basal Lee quartzose sand member, appears porous
- \*1513-1515 2' Sandstone, white, but medium grained, subangular, poor to moderately sorted, abundant iron stains, with scattered carbonaceous material and dark argillaceous material. About 90% quartz. Fair to good porosity
- \*1515-1539 24' Sandstone, white, mostly fine grained but some medium grained, subangular to subrounded, well sorted, with rare, scattered muscovite and coal, good porosity, over 95% quartz, coal no longer present by 1518', no clay or silt matrix material, definitely characteristic of the Lee quartzose sands. Some clay and accessory minerals are present (1527-1533)
- \*1539-1570 31' Sandstone, white, fine to coarse grained, moderately sorted, subangular to subround, continued quartzose, but considerable clay present, and some rare dark argillaceous material in upper 5' and 1565-1570, fair porosity
- \*1570-1584 14' Sandstone, white, quartzose, fine to medium grained, moderate sorting, subangular to sub-round, scattered iron stains, very little clay matrix present
- \*1584-1591 7' Sandstone, white, mostly medium grained, moderate sorting, subangular, almost 100% quartz, no clay or silt material
- \*1591-1596 5' Sandstone, like that above, only presence of fine grained silt or clay material

- \* 1597-1608 11' Sandstone, white, quartzose, fine to medium grained, occasionally coarse grained, again no matrix material present. Would appear to have good porosity, 100% quartz
- \*1608-1621 22' Sandstone, white, quartzose, conglomeratic, composed almost entirely of pure, white, large (up to 8.0 mm), angular granules of quartz. Some quartz has a brownish stain due to the presence of coal, coal chunks and other carbonaceous material has been reworked and redeposited with the coarse, pebble conglomerate. A very interesting interval to observe because of the ~~generally rare~~ appearance of coal and large quartz pebbles together. It is supposed here that the upper Pocahontas coal sequence has been reworked into the transgressive, near shore, quartz sands of the Lee formation, and an unconformity of 1621' separates the two formations
- unconformity -
- 1621-1636 15' Shale mostly, dark gray, carbonaceous, and micaceous. Some large quartz pebbles present, but more than likely due to contamination
- 1636-1662 36' Sandstone, light gray, fine grained, poorly sorted, subangular, with abundant muscovite, biotite, reddish and dark minerals, some calcareous cement and considerable carbonaceous material and matrix material. Represents a striking difference from the massive quartzose sand interval from (1510-1621). Possibly a 1' coal seam present in interval 1642-1650
- 1662-1679 17' Shale, gray, silty, finely micaceous
- 1679-1717 38' Sandstone, light gray, fine grained, subangular, poorly sorted, interstitially silty, with abundant muscovite, biotite, chlorite, siderite, hematite, and coal. About 50-55% quartz, no porosity. Interval contains some shale like that above, probably contamination
- 1717-1739 22' Shale, gray, silty locally with some occasional ironstone and scattered siderite nodules

1739-1755	16'	Sandstone, gray, very fine grained, continued poorly sorted, micaceous with abundant accessory minerals
1755-1767	12'	Siltstone, gray, micaceous, some sandstone
*1767-1773	6'	Coal, a very good show, is generally very pure, vitreous luster, with conchoidal fracture. Probably the Pocahontas #3 coal
1773-1783	10'	Shale, gray, dull, silty, pebbly
1783-1790	7'	Missing
1790-1800	10'	Sandstone, light gray to light tan, medium to fine grained, subangular, poorly sorted, micaceous, feldspathic, and abundant with other accessory minerals
1800-1840	40'	Shale, gray, silty, with occasional siderite nodules
1840-1864	24'	Siltstone, sandy, light gray, micaceous grades downward to a shaly siltstone
1864-1883	19'	Shale, gray, fair fissility
1883-18 <del>4</del> <sup>6</sup>	16'	Interbedded, shale, siltstone; sand and coal. Mostly sand and shale with lesser amount of siltstone and rare occasional coal
1896-1941	45'	Sandstone, light gray, fine grained, poorly sorted, subangular to subround with abundant red, dark and green minerals, muscovite and coal, 65% quartz
1941-2024	83'	Sandstone, white to light gray, fine to medium grained, poorly sorted, subangular with clay, silica and calcareous cement, dark argillaceous material, and scattered muscovite, hematite, chlorite, and carbonaceous material, about 75-80% quartz, no porosity
2024-2034	10'	Shale, gray, locally silty, micaceous with some visible slickensiding

2034-2082      48'      Sandstone, light gray, much like previous sand interval, continued poorly sorted, fine to medium grained, with abundant muscovite, hematite, carbonaceous material, and clay and silt matrix, poor porosity

2082              Red and green shales, slightly calcareous. Typical Bluestone lithology.

Post Lee	0-1510	1510'
Lee Formation	1510-1621	111'
Pocahontas Fm.	1621-2082	461'

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Samples for this well were examined by Mr. David Bowen in preparing a Master's thesis entitled "Subsurface Study of the Lee Formation in Buchanan County, Virginia," for the Virginia Polytechnic Institute. A microfilm copy of the thesis, containing a detailed description of the Post-Princeton strata in this well, is available for reference in the Library of the Virginia Division of Mineral Resources.

Formation boundaries stated in this thesis are as follows:

System

Formation

Pennsylvanian

Post-Lee Strata, Undivided	in bottom	0' 669'
Lee Formation	top bottom	669' 2082'

Mississippian

Bluestone Formation	top bottom	2082' 2492'
Princeton Sandstone	top bottom	2492' --

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 Index No. 109  
 VDMR No. 19  
 Elevation: 1826.4'

Remarks: Referred to measured sections 241, 261, 280, 281, 282, 283 on Buchanan County geological map. Referred to the general coal geology on Levisa Fork between Grundy and Marvin. Referred to Beatrice Pocahontas supply shaft 2 miles SW; Va. Pocahontas Mine No. 2, 2 miles N; the Marvin, core, 2 miles SE. The coal geology and elevation of well, indicate well spudded 20' below the Lower Banner coal, 80' above the Kennedy coal, 300' above the Raven coal, 450' above the Jawbone coal, and 500-550' above the Tiller coal. Correlations by Marshall Miller, 1970-74, VDMR.

<u>Formation</u>	<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>
<b>Pennsylvanian System</b>			
Post Lee Formation "in at surface"	1510'		1510'
		Lower Banner coal at -126'	
		Kennedy coal 99-101	
		Raven coal horizon at 300'	
		Jawbone coal horizon at 450'	
		Tiller coal 507 510	
		Upper Horsepen? coal 1028-1030	
		War Creek coal 1202-1208	
		Unidentified coal 1281-1282	
Lee Formation	1510	1621	111'
		111' quartzose	
		22' conglomeratic	
Pocahontas Formation	1621	2082	461'
		Pocahontas coal 1642-1650	
		Pocahontas #3 coal 1767-1773	
<b>Mississippian System</b>			
Bluestone Formation	2082	2492	410'
Pride Shale	?	2492	Top cannot be determined

Princeton SS	2492	2649?	No differentiation can be made from the descriptions. No attempt can be done to name the Tallery-Neal or Falls Mill SS.
Little Stone Gap Member	2649	2713	64'
Stone Gap SS	3141	3151	12'
	3221	3275	54'
Bluefield Formation	3275	3621	346'
Greenbrier Formation	3621	4348	727'
Maccrady	4348		