

Operator: Clinchfield Coal Corp.
 Farm: Virginia Coal and Iron Co.
 Well No.: 144
 Index No.: 6
 Location: Wise County
 1200' N of 37°00'
 8500' E of 82°40'

Elevation: 2322.9'

Total Depth: 4006'

Remarks: Elevation and location of well with reference to: measured sections 369 and 356; coal geology along Guest River; and Rocky Forte Core 1 1/2 miles east; indicate that well located about 60' above the Dorchester coal, and about 850' above the Kennedy coal. Correlations by Marshall Miller, 1970-74, VDMR.

| <u>Formation</u> | <u>Top</u> | <u>Bottom</u> | <u>Thickness</u> |
|------------------------------------|------------|---------------------------------|------------------|
| Post Lee Formation "in at surface" | | 834 | 834' |
| | | Dorchester coal 53-55 | |
| | | Gladeville sand interval 55-105 | 50' |
| | | Norton coal 150-152 | |
| | | Hagy coal 325-327 | |
| | | Kennedy coal 810-811 | |
| Lee Formation | 834 | 2210 | 1376' |
| | | quartzose sand 834-950 | 116' |
| | | quartzose sand 1341-1390 | 49' |
| | | quartzose sand 1487-1552 | 65' |
| | | quartzose sand 1572-1582 | 10' |
| | | quartzose sand 1590-1601 | 11' |
| | | quartzose sand 1648-1679 | 31' |
| | | quartzose sand 1687-1764 | 45' |
| | | *War Creek coal seam 1764-1767 | |
| | | quartzose sand 1771-1774 | 3' |
| | | quartzose sand 1803-1902 | 99' |
| | | quartzose sand 1958-2021 | 63' |
| | | quartzose sand 2024-2198 | 174' |
| | | quartzose sand 2201-2210 | 9' |
| | | total quartzose sand | 675' |
| Pocahontas Formation | "absent" | | |

*Recorrelation indicated War Creek coal seam absent.

Mississippian System

| | | | |
|-------------------------|------|------|------|
| Bluestone Formation | 2210 | 2603 | 397' |
| Pride Formation | 2440 | 2603 | 163' |
| Princeton Sand Interval | 2603 | ? | ? |
| Stony Gap Sand | ? | ? | ? |
| Greenbrier Formation | 3402 | 3945 | 543' |
| Maccrady Formation | 3945 | | |

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Remarks: Well has been sufficiently logged by K. Robinson, VDMR, 1962.

The summary below was completed by Marshall S. Miller, VDMR, 1971, to establish recognition of the Lee quartzose members and coal seams of the Lower Pennsylvanian System. All other descriptions and formational boundaries are referred to K. Robinson's geologic log.

| <u>Depth</u> | <u>Thickness</u> | <u>Descriptions</u> |
|--------------|------------------|--|
| 0-834 | 834' | The well cuttings of this interval, and the geologic log of Robinson were studied and reviewed; no additions or revisions are necessary. No consistent quartzose sand was observed in this interval. |
| 834-875 | 41' | Sandstone, white, quartzose, fine to very fine grained, subrounded, well sorted, rare accessory minerals, scattered dark rock fragments; about 90% quartz, 5% matrix, 5% rock fragments |
| 875-950 | 75' | Sandstone, white, quartzose, fine grained to granular grained, subround to subangular, moderately to poorly sorted, rare accessory minerals, scattered dark rock fragments, little or no matrix material |
| 1341-1375 | 34' | Sandstone, white, quartzose, fine to coarse grained, subround to subangular, moderately sorted, locally "speckled" with fine carbonaceous fragments, rare muscovite, and scattered dark rock fragments, small amount of calcareous clay-matrix |
| 1375-1390 | 15' | Sandstone, as in 1341-1375, conglomeratic |

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| 1487-1500 | 13' | Sandstone, white, coarse grained to granular, and conglomeratic, subangular to subround, no matrix material, secondary quartz overgrowths visible; 95% quartz |
| 1500-1510 | 10' | Sandstone, white, quartzose, coarse grained, subround, moderately sorted, little or no matrix material, few rounded dark rock fragments, 90 to 95% quartz |
| 1510-1544 | 34' | Sandstone, white, quartzose, coarse grained to granular and conglomeratic, subangular to subround, moderately sorted to poorly sorted, 95% quartz |
| 1544-1552 | 8' | Sandstone, white, quartzose, medium grained to granular, subangular to subround, poorly sorted, scattered dark rock fragments, small amount calcareous-clay matrix, 90 to 95% quartz |
| | | *The remainder of the Pennsylvanian section is described without omission because of the abundance of quartzose sands. |
| 1552-1572 | 20' | Sandstone, light gray to brown, fine to medium grained, subround to subangular, moderately to poorly sorted, with abundant muscovite, biotite, chlorite, and carbonaceous-silt partings, abundant clay-silt matrix material; about 65% quartz, 20% matrix, 15% rock and mineral fragments |
| 1572-1582 | 10' | Sandstone, white, quartzose, fine to coarse grained to granular and conglomeratic, subround to subangular, no visible matrix or cementing material; 95 to 100% quartz |
| 1582-1590 | 8' | Siltstone, light to dark gray, moderately hard, siliceous with carbonaceous material, finely micaceous |
| 1590-1601 | 11' | Sandstone, white, quartzose, fine to medium grained, subround to round, moderately well sorted, interstitially silty, about 90% quartz |

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| 1601-1648 | 47' | Sandstone, light gray to white, moderately quartzose, fine to coarse grained, subangular to subround, poorly sorted; with abundant muscovite, biotite, chlorite, dark carbonaceous material, abundant micaceous-carbonaceous silt partings, and abundant clay-silt matrix; 80% quartz, 10% matrix, 10% rock and mineral fragments |
| 1648-1665 | 31' | Sandstone, white, quartzose, fine to coarse grained, moderately sorted, subround to subangular, with rare micas and dark rock fragments, small amount of clay matrix material; 90% quartz |
| 1665-1679 | 14' | Sandstone as in 1648-1665, conglomeratic |
| 1679-1687 | 8' | Siltstone, dark gray, finely micaceous, shaly |
| 1687-1732 | 45' | Sandstone, white, quartzose, fine to coarse grained, subround to subangular, moderately sorted, rare muscovite, and dark rock fragments, small amount of calcareous clay matrix; 90 to 95% quartz, 5 to 10% matrix, 0 to 5% rock fragments |
| 1732-1752 | 20' | Sandstone as in 1687-1732, conglomeratic |
| 1752-1764 | 12' | Sandstone as in 1687-1732 |
| 1764-1767 | 3' | Coal, pure, high vitreous luster, blocky and conchoidal fracture |
| 1767-1771 | 4' | Shale, dark gray, carbonaceous |
| 1771-1774 | 3' | Sandstone, white, quartzose, fine to granular grained, subangular, poorly sorted |
| 1774-1777 | 3' | Coal |
| 1777-1780 | 3' | Shale, dark gray, carbonaceous |
| 1780-1803 | 23' | Sandstone, white to light gray, fine to medium grained, subround, moderately sorted, abundant clay-silt matrix, and dark rock fragments; 85% quartz |

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| 1803-1813 | 10' | Sandstone, white, quartzose, fine grained, subround to round, well sorted, rare matrix, or rock fragments |
| 1813-1830 | 17' | Sandstone, white, quartzose, medium to coarse grained, subangular to subround, moderately to poorly sorted, rare matrix and rock fragments; 95% quartz |
| 1830-1848 | 18' | Sandstone as in 1813-1830, conglomeratic |
| 1848-1902 | 54' | Sandstone as in 1813-1830 |
| 1902-1947 | 45' | Siltstone, light gray to gray, hard, brittle, locally siliceous, and argillaceous, with abundant carbonaceous fragments and scattered muscovite |
| 1947-1950 | 3' | Coal, pure, good vitreous luster, conchoidal fracture |
| 1950-1958 | 8' | Siltstone, as in 1902-1947 |
| 1958-1984 | 36' | Sandstone, white, quartzose, medium to coarse grained, subangular to subround, moderately sorted, little or no matrix material, rare dark rock fragments; 95% quartz |
| 1984-2021 | 37' | Sandstone, white, quartzose, fine to medium grained, subround, moderately well sorted, with scattered muscovite and dark rock fragments and carbonaceous material; 90% quartz |
| 2021-2024 | 3' | Siltstone, dark gray, finely micaceous, carbonaceous |
| 2024-2033 | 9' | Sandstone, white, quartzose, fine grained, subrounded, well sorted, with rare coaly laminations, muscovite, hematite and pyrite, small amount of matrix-material; about 90% quartz, 5% matrix, 5% rock and mineral fragments |
| 2033-2064 | 31' | Sandstone, white, quartzose, medium grained, subangular to subround, little or no matrix material, rare rock fragments; 95% quartz |

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| 2064-2069 | 5' | Sandstone as in 2033-2064, conglomeratic |
| 2069-2074 | 5' | Sandstone as in 2033-2064 |
| 2074-2102 | 28' | Sandstone, white, quartzose, medium to very coarse grained, subangular, poorly sorted, rare matrix, 95% quartz |
| 2102-2124 | 22' | Sandstone, white, quartzose, fine to medium grained, subangular to subround, poorly sorted, with scattered muscovite, carbonaceous material, other dark rock fragments, small amount of calcareous clay-silt matrix, about 90% quartz, 5% matrix, 5% rock and mineral fragments |
| 2124-2170 | 46' | Sandstone, white, quartzose, fine to medium grained, subangular to subround, moderately sorted, no matrix material, no rock fragments, appears to be 100% quartz |
| 2170-2198 | 28' | Sandstone as in 2124-2170, conglomeratic |
| 2198-2201 | 3' | Coal, with interbedded carbonaceous siltstone |
| 2201-2210 | 9' | Sandstone, white, quartzose, coarse grained to granular, and conglomeratic, 100% quartz |
| 2210-2226 | 16' | Siltstone, light gray, light brown, green, greenish gray, slightly calcareous, with some finely divided, carbonaceous material |
| 2226 | | Red, green and gray shales |