

Company: United Fuel Gas Co.  
 Farm: National Shawmut Bk. of Boston  
 Well No.: 6416  
 Elevation: 1157.43'  
 Total depth: 5250'  
 Location: Buchanan County  
           1150' S. of 37° 30'  
           6350' E. of 82° 00'  
 Drilling Commenced: 11/28/49  
 Well Completed: 6/8/50  
 Result: Dry hole

Geologic Log  
 Samples studied and  
 described by:  
 John M. Wilson  
 Virginia Division of  
 Mineral Resources  
 June, 1963

## GEOLOGIC LOG

Depth	Thickness	Description
0-290	290	No samples
290-318	28	Sandstone, white, light gray, well cemented, very fine to fine grained, well sorted, subrounded to angular, interstitially silty, siliceous, with; abundant biotite, abundant muscovite, common chlorite, rare carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous. Stringers of Siltstone, locally shaly, medium to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; common muscovite, common iron oxide stains
318-336	18	Sandstone, white, light gray-green, moderately cemented, very fine to fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; abundant biotite, abundant muscovite, common carbonaceous material, common iron oxide stains, Nonporous to slightly porous. Stringers of Siltstone as in 290-318
336-367	31	Sandstone, white, clear, well cemented, very fine to fine grained, well sorted, subangular to angular, siliceous; with; common biotite, common muscovite, rare chlorite, rare carbonaceous material, common iron oxide stains. Nonporous to slightly porous
367-371	4	No samples
371-441	70	Sandstone, as in 336-367

441-451	10	Interbedded; Sandstone, as in 371-441, with; Siltstone, locally finely sandy, locally shaly, light to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, siliceous argillaceous, with; common biotite, abundant muscovite, common carbonaceous material, rare iron oxide stains
451-470	19	Sandstone, white, clear, moderately cemented, very fine to medium grained, medium sorted, subrounded to angular, siliceous, calcareous, with; common biotite, common muscovite, rare chlorite, rare carbonaceous material, common iron oxide stains, common silty-micaceous partings, Nonporous to slightly porous. Str. zone of
470-475	5	Conglomeratic Sandstone, white, clear, moderately cemented, medium to very coarse grained, common granule, poorly sorted, subrounded to angular, siliceous, with; common biotite, common muscovite, abundant chlorite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous
475-486	11	Conglomeratic Sandstone, as in 470-475, with stringers of Siltstone, carbonaceous, dark gray, moderately soft, flaky, no apparent bedding to poorly fissile, argillaceous, with; abundant muscovite, rare iron oxide stains
486-523	37	Sandstone, white, clear, well cemented, very fine to medium grained, medium sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, common chlorite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous
523-536	13	Conglomeratic Sandstone, white, clear, milky white, moderately cemented, fine to very coarse grained, abundant granule, common pebble, poorly sorted, subrounded to angular, siliceous, with; rare biotite, rare muscovite, rare chlorite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous
536-544	8	Shale, locally silty, medium to dark gray, moderately hard, brittle, fair to good fissility, argillaceous, with; rare muscovite, rare carbonaceous material, rare iron oxide stains
544-555	11	No samples
555-564	9	Shale, as in 536-544
564-587	23	Interbedded Sandstone, white, light gray, well cemented, very fine to fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; abundant biotite, abundant muscovite, common carbonaceous material, rare iron oxide stains. Nonporous to slightly porous

		Siltstone, locally finely sandy, locally shaly, light to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; common biotite, common muscovite, abundant carbonaceous material
587-621	34	Siltstone, locally finely sandy, locally shaly, light to dark gray, moderately hard, brittle, no apparent bedding to fair fissility, siliceous, argillaceous, with; abundant biotite, abundant muscovite, abundant carbonaceous material
621-671	50	Sandstone, silty, white, light gray, moderately cemented, very fine to medium grained, medium sorted, subrounded to angular, interstitially silty, siliceous, with; abundant biotite, abundant muscovite, common chlorite, abundant carbonaceous material, rare iron oxide stains, abundant silty-micaceous partings. Nonporous to slightly porous
671-691	20	Interbedded; Sandstone, as in 621-671, with; Siltstone, locally shaly, medium to dark gray, moderately soft, brittle, no apparent bedding, to poorly fissile, argillaceous, with; abundant biotite, abundant muscovite, common carbonaceous material
691-706	15	Shale, carbonaceous, dark gray, black, moderately soft, flaky, good fissility, argillaceous, with; rare muscovite
706-724 =	18	Interbedded Siltstone, locally shaly, medium to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; common muscovite, abundant carbonaceous material, rare iron oxide stains Sandstone, white, light gray, moderately cemented, very fine to fine grained, well sorted, subrounded <sup>t</sup> subangular, interstitially silty, siliceous, with; abundant biotite, abundant muscovite, common chlorite, rare iron oxide stains. Nonporous to slightly porous
724-770	46	Sandstone, white, milky white, moderately cemented, very fine to coarse grained, poorly sorted, rounded to subangular, interstitially silty, siliceous, with; abundant biotite, abundant muscovite, common chlorite, common carbonaceous material, rare iron oxide stains, abundant silty-micaceous partings. Nonporous to slightly porous

770-781	11	Interbedded; Sandstone, as in 724-770, with; Siltstone, locally shaly, medium to dark gray, moderately soft, flaky, no apparent bedding to poorly fissile, argillaceous, with; abundant muscovite
781-793	12	Siltstone, as in 770-781
793-815	22	Sandstone, white, clear, moderately cemented, fine to medium grained, well sorted, subrounded to subangular, siliceous, with; common biotite, common muscovite, common carbonaceous material, common iron oxide stains. Nonporous to slightly porous
815-820	5	Sandstone, as in 793-815, with abundant iron oxide staining
820-830	10	Sandstone, as in 793-815
830-850	20	Sandstone, as in 793-815, with abundant iron oxide staining
850-859	9	Conglomeratic Sandstone, white, clear, milky white, moderately cemented, fine to very coarse grained, common granule, poorly sorted, subrounded to subangular, interstitially silty, siliceous, with; abundant biotite, abundant muscovite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous
859-864	5	No samples
864-876	12	Conglomeratic Sandstone, as in 850-859
876-889	23	Sandstone, white, clear, moderately cemented, fine to coarse grained, medium sorted, subrounded to angular, siliceous, with; common biotite, common muscovite, rare chlorite, rare carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous
889-900	11	Conglomeratic Sandstone, white, clear, milky white, well cemented, very fine to very coarse grained, common granule, poorly sorted, subrounded to subangular, siliceous, with; common biotite, common muscovite, rare chlorite, rare carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous

- 900-916 16 Sandstone, white, clear, moderately cemented, fine to medium grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, rare carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous
- 916-934 18 Sandstone, white, milky white, moderately cemented, medium to very coarse grained, medium sorted, rounded to subangular, siliceous, with; rare biotite, rare muscovite, common carbonaceous material, abundant iron oxide stains. Slightly porous
- 934-955 21 Conglomeratic Sandstone, white, milky, white, well cemented, medium to very coarse grained, abundant granule, common pebble, poorly sorted, subrounded to angular, siliceous, with; rare biotite, rare muscovite, common chlorite, common carbonaceous material, abundant coal fragments (vitreous, conchoidal fracture, possible 1-2' bed in this interval) rare iron oxide stains. Nonporous to slightly porous
- 955-989 34 Interbedded Sandstone, white, clear, moderately cemented, fine to very coarse grained, poorly sorted; subrounded to angular, interstitially silty, siliceous, with; common biotite, common muscovite, rare chlorite, abundant iron oxide stains. Nonporous to slightly porous. Siltstone, locally finely sandy, light to dark gray, moderately soft, flaky, no apparent bedding, siliceous, argillaceous, with; common biotite, abundant muscovite, common carbonaceous material, common iron oxide stains
- 989-1116 27 Sandstone, silty, white, light gray, well cemented, very fine to medium grained, medium sorted, subrounded to angular, interstitially silty, siliceous, calcareous (slightly), abundant biotite, abundant muscovite, common carbonaceous material, common iron oxide stains. Nonporous to slightly porous. Minor stringers of Siltstone, locally finely sandy, light to medium gray, moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; abundant biotite, abundant muscovite, common carbonaceous material, rare iron oxide stains
- 1116-1140 24 Sandstone, white, milky white, moderately cemented, fine to very coarse grained, poorly sorted, subrounded to angular, interstitially silty, siliceous, with; rare biotite, common muscovite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous

1140-1160	20	Shale, locally silty, carbonaceous (locally), medium to dark gray, moderately soft, flaky, fair to good fissility, argillaceous, with; rare biotite, common muscovite, abundant carbonaceous material, rare iron oxide stains
1160-1170	10	Shale, as in 1140-1160, with; Interbedded; Sandstone, silty, white, light gray, well cemented, very fine to fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, rare carbonaceous material, common iron oxide stains, Nonporous to slightly porous
1170-1213	43	Sandstone, white, clear, moderately cemented, very fine to fine grained, well sorted, subrounded, to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, common carbonaceous material, abundant iron oxide stains, abundant silty-micaceous partings. Nonporous to slightly porous
1213-1225	12	Interbedded Siltstone, carbonaceous, dark gray, soft, flaky, poorly fissile, argillaceous, rare biotite, abundant muscovite, common iron oxide stains. Coal, vitreous, conchoidal fracture, blacky fracture
1225-1235	10	Interbedded; Siltstone, as in 1213-1225, with; Sandstone, white, clear, well cemented, very fine to fine grained, well sorted, subrounded to angular, siliceous, with; common biotite, common muscovite, common iron oxide stains. Nonporous to slightly porous
1235-1265	30	Sandstone, as in 1225-1235, with; abundant silty-micaceous partings (contamination?)
1265-1270	5	Sandstone, as in 1235-1265, with stringers of Siltstone, locally shaly, carbonaceous (locally), dark gray, moderately soft, flaky, poor to fair fissility, argillaceous, with; abundant muscovite
1270-1283	13	Conglomeratic Sandstone, white, clear, milky, white, moderately cemented, very fine to very coarse grained, common granule, poorly sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, rare chlorite, common carbonaceous material, abundant iron oxide stains. Slightly porous

1283-1342	59	Sandstone, white, clear, moderately cemented, fine to coarse grained, medium sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, rare carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous
1342-1373	31	Conglomeratic Sandstone, white, clear, moderately cemented, medium to very coarse grained, common granule, poorly sorted, subangular to angular, siliceous, with; abundant biotite, common muscovite, common chlorite, common carbonaceous material, rare iron oxide stains. Nonporous to slightly porous
1373-1403	30	Sandstone, white, orange, well cemented, fine to medium grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; rare biotite, common muscovite, rare carbonaceous material, abundant iron oxide stains. Slightly porous
1403-1425	22	Sandstone, silty, white, light gray, orange, well cemented, very fine to medium grained, medium sorted, subrounded to subangular, interstitially silty, siliceous, with; abundant biotite, abundant muscovite, abundant carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous. Minor stringers Siltstone, locally shaly, medium to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; common muscovite, abundant iron oxide stains
1425-1435	10	Siltstone, grades locally to a very fine grained Sandstone, locally finely sandy, locally shaly, medium to dark gray, brown, moderately hard, brittle, no apparent bedding to poorly fissile, siliceous, argillaceous, with; abundant biotite, abundant muscovite, common carbonaceous material, rare iron oxide stains
1435-1450	15	Sandstone, with minor Siltstone stringers, as in 1403-1425
1450-1467	17	Sandstone, white, clear, moderately cemented, fine to coarse grained, medium sorted, subangular to angular, siliceous, with; rare biotite, common muscovite, rare carbonaceous material, common iron oxide stains. Slightly porous
1467-1482	15	Interbedded; Sandstone, as in 1450-1467 with; Siltstone, locally shaly, medium to dark gray, moderately soft, flaky, no apparent bedding to poorly fissile, argillaceous, with; abundant biotite, abundant muscovite, abundant carbonaceous material, rare iron oxide stains

1482-1491	9	Siltstone, as in 1467-1482
1491-1520	29	Sandstone, white, clear, moderately cemented, very fine to medium grained, medium sorted, subrounded to subangular, interstitially silty, siliceous, with; rare biotite, common muscovite, rare chlorite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous
1520-1534	14	Sandstone, white, clear, moderately cemented, very fine to fine grained, well sorted, subangular to angular, siliceous, with; common biotite, common muscovite, common carbonaceous material, common iron oxide stains. Nonporous to slightly porous
1534-1544	10	Conglomeratic Sandstone, white, clear, milky white, well cemented, medium to very coarse grained, common granule, poorly sorted, subrounded to angular, interstitially silty, siliceous, with; rare muscovite, rare carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous. Minor stringers of Siltstone, locally shaly, medium gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; rare iron oxide stains
1544-1564	20	Conglomeratic Sandstone, as in 1534-1544
1564-1594	30	Siltstone, locally shaly, light gray, red, green, moderately soft, flaky, poorly fissile, calcareous (locally), argillaceous, ferruginous, rare biotite, rare muscovite, rare carbonaceous material, common iron oxide stains. Stringers of Limestone, dolomitic, tan, moderately hard, no apparent fossil content, no apparent bedding to platy, cryptocrystalline, common iron oxide staining
1594-1602	8	Siltstone, locally shaly, light to dark gray, green, rare maroon-drab, moderately hard, brittle, no apparent bedding to poorly fissile, calcareous (slightly), argillaceous, rare biotite, rare muscovite, rare carbonaceous material
1602-1613	11	Shale, silty, medium to dark gray, moderately soft, flaky, poor to fair fissility, argillaceous, with; rare muscovite, common carbonaceous material, common iron oxide stains
1613-1621	8	Siltstone, light to dark gray, red, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, ferruginous, with; rare muscovite, abundant chert, (rose, milky white, tan), common carbonaceous material, abundant iron oxide stains



1621-1645	24	Siltstone, locally finely sandy, locally shaly, medium to dark gray, red, green, moderately hard, brittle, no apparent bedding to poorly fissile, calcareous (slightly), argillaceous, ferruginous, with; common biotite, common muscovite, rare carbonaceous material, rare iron oxide stains
1645-1661	16	Siltstone, locally shaly, red, green-gray, moderately hard, brittle, poor to fair fissility, calcareous (locally), argillaceous, ferruginous, with; rare muscovite, rare carbonaceous material
1661-1686	25	Siltstone, as in 1645-1661, with stringers of, Sandstone, light gray-green, well cemented, very fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, rare carbonaceous material, Nonporous to slightly porous
1686-1691	5	No samples
1691-1699	8	Interbedded; Siltstone and Sandstone, as in 1661-1686, with abundant coal (vitreous, conchoidal fracture, possible 2 foot coal bed in this interval)
1699-1704	5	Lithologies as in 1661-1686
1704-1736	32	Siltstone, grades locally to a very fine grained Sandstone, locally finely sandy, light to medium gray, moderately hard, tough, no apparent bedding, siliceous, argillaceous, with; common biotite, common muscovite, common carbonaceous material, rare coal iron oxide stains.
1736-1751	15	Interbedded; Siltstone, as in 1704-1736, with; Sandstone, white, light gray, well cemented, very fine to medium grained, medium sorted, subrounded to angular, siliceous, calcareous (slightly), with; rare biotite, rare muscovite, rare carbonaceous material, common iron oxide stains. Nonporous to slightly porous
1751-1757	6	Siltstone, locally finely sandy, locally shaly, red, green, maroon-drab, moderately hard, brittle, no apparent bedding to poorly fissile, siliceous, argillaceous, ferruginous, with; common biotite, common muscovite, rare pyrite, rare carbonaceous material
1757-1765	8	Interbedded; Siltstone, as in 1751-1757, with; Sandstone, silty, white, clear, well cemented, very fine to fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; rare biotite, rare muscovite, rare carbonaceous material

1765-1780	15	Shale, locally silty; medium to dark gray, red (common), moderately soft, flaky, fair to good fissility, argillaceous, with; rare muscovite, common carbonaceous material, common iron oxide stains. Minor stringers of Sandstone, as in 1757-1765
1780-1805	25	Interbedded; Shale and Sandstone, as in 1765-1780
1805-1815	10	Shale, as in 1780-1805, with; Minor stringers of Sandstone, white, clear, moderately cemented, fine to medium grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; rare muscovite, common iron oxide stains, Nonporous to slightly porous
1815-1838	23	Siltstone, grades locally to a very fine grained Sandstone, locally finely sandy, light to dark gray, red (rare), moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; common biotite, common muscovite, rare carbonaceous material, rare iron oxide stains
1838-1856	18	Siltstone, locally finely sandy, locally shaly, light to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, siliceous, argillaceous, with; common biotite, common muscovite, common carbonaceous material, rare iron oxide stains
1856-1867	11	Siltstone, grades to a very fine grained Sandstone, locally finely sandy, light to medium gray, moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; common biotite, common muscovite, common carbonaceous material, rare iron oxide stains
1867-1870	3	Siltstone, locally shaly, medium to dark gray, red (rare), black, moderately hard, to moderately soft, flaky, no apparent bedding to poorly fissile, siliceous, argillaceous, with; rare biotite, common muscovite, common carbonaceous material, rare iron oxide stains
1870-1877	7	Siltstone, as in 1867-1870, with stringers of, Sandstone, white, light gray, moderately cemented, very fine to fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, rare muscovite, rare carbonaceous material, rare iron oxide stains. Nonporous to slightly porous
1877-1887	10	Lithologies as in 1870-1877, interbedded

1887-1902	15	Sandstone, white, clear, moderately cemented, very fine to fine grained, well sorted, subrounded to angular, siliceous, with; rare biotite, rare muscovite, rare carbonaceous material, common iron oxide stains. Slightly porous. Minor stringers of Siltstone, as in 1867-1870
1902-1913	11	Lithologies, as in 1887-1902, with abundant iron oxide staining
1913-1923	10	Siltstone, locally shaly, medium to dark gray, moderately soft, flaky, no apparent bedding to poorly fissile, argillaceous, with; rare muscovite, common iron oxide stains. Stringers of Sandstone, as in 1887-1902
1923-1971	48	Sandstone, white, clear, orange, moderately cemented, very fine to medium grained, medium sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous. Stringers of Siltstone, as in 1913-1923
1971-1983	12	Conglomeratic Sandstone, white, clear, milky white, moderately cemented, medium to very coarse grained, common granule, rare pebble, poorly sorted, subrounded to angular, siliceous, with; rare biotite, rare muscovite, rare chlorite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous. Stringers of Siltstone, locally shaly, carbonaceous (locally), medium to dark gray, red, maroon-drab, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, rare muscovite, common iron oxide stains
1983-1987	4	Lithologies, as in 1971-1983, interbedded
1987-2004	17	Sandstone, white, clear, well cemented, very fine to fine grained, well sorted, subrounded to subangular, interstitially silty siliceous, with; common biotite, common muscovite, common carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous. Minor stringers of Siltstone, locally shaly, medium to dark gray, red (rare), moderately soft, flaky, poorly fissile, argillaceous, with; common muscovite, common carbonaceous material

2004-2017	13	Conglomeratic Sandstone, white, clear, milky white, moderately cemented, medium to very coarse grained, common granule, common granule, poorly sorted, subrounded to angular, interstitially silty, siliceous, with; rare biotite, rare muscovite, rare carbonaceous material, abundant iron oxide stains. Nonporous to slightly porous. Minor stringers of Siltstone, as in 1987-2004
2017-2022	5	Sandstone, white, clear, moderately cemented, fine to coarse grained, medium sorted, rounded to subangular, siliceous, with; rare biotite, rare muscovite, rare carbonaceous material, common iron oxide stains. Slightly porous. Minor stringers of Siltstone, as in 2004-2017
2022-2024	2	Interbedded; lithologies, as in 2017-2022
2024-2030	6	Conglomeratic Sandstone, white, clear, milky white, moderately cemented, fine to very coarse grained, common granule, poorly sorted, subrounded to subangular, interstitially silty, siliceous, with; rare biotite, rare muscovite, common carbonaceous material, common iron oxide stains. Nonporous to slightly porous Stringers of Siltstone, locally shaly, medium to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; rare muscovite, common iron oxide stains
2030-2037	7	Sandstone, white, clear, moderately cemented, fine to medium grained, rare coarse grained, medium sorted, subrounded to angular, siliceous, with; rare biotite, rare muscovite, rare chlorite, common carbonaceous material, common iron oxide stains. Slightly porous to porous. common silty-micaceous partings (contamination?)
2037-2042	5	Interbedded conglomeratic Sandstone, clear, milky white, moderately cemented, medium to very coarse grained, common granule, poorly sorted, subrounded to angular, siliceous, with; rare biotite, common muscovite, rare carbonaceous material, common iron oxide stains. Nonporous to slightly porous. Shale, locally silty, medium to dark gray, red (rare), moderately soft, flaky, fair to good fissility, argillaceous, with; muscovite, rare iron oxide stains
2042-2044	2	Conglomeratic Sandstone, as in 2037-2042, with stringers of Siltstone, as in 2037-2042.

2044-2049	5	Siltstone, locally finely sandy, locally shaly, light to dark gray, red, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; rare biotite, common muscovite, common carbonaceous material, common iron oxide stains. Stringers of Limestone, shaly, silty, light gray, moderately hard, no apparent fossil content, no apparent bedding, cryptocrystalline, with; rare mica, rare calcite, common iron oxide staining
2049-2050	1	Siltstone, as in 2044-2049
2050-2054		Siltstone, locally shaly, medium to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; rare muscovite, rare carbonaceous material, common iron oxide stains
2054-2129	78	Interbedded; Siltstone, as in 2050-2054, with; Siltstone, grades locally to a very fine grained Sandstone, locally finely sandy, light gray, moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; common biotite, common muscovite, rare carbonaceous material, rare iron oxide stains
2129-2134	5	Siltstone, locally shaly, dark gray, maroon-drab, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; rare muscovite, abundant carbonaceous material
2134-2166	32	Interbedded Siltstone, locally finely sandy, locally shaly, medium to dark gray, moderately hard, brittle, no apparent bedding, argillaceous, with; rare biotite, common muscovite, common iron oxide stains Sandstone, silty, white, light gray, well cemented, very fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; common biotite, common muscovite, common iron oxide stains. Nonporous to slightly porous
2166-2192	26	Sandstone, as in 2134-2166, with minor stringers of Siltstone, as in 2134-2166
2192-2199	7	Siltstone, locally shaly, dark gray, red, green, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; rare biotite, common muscovite, rare carbonaceous material, rare iron oxide stains, Stringers of Limestone, light brown, tan, moderately hard, no apparent fossil content, no apparent bedding, cryptocrystalline, with; common calcite, common iron oxide staining
2199-2218	26	Siltstone, grades locally to a very fine grained, Sandstone, locally finely sandy, locally shaly,

		light to dark gray, red (rare), moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; common biotite, common muscovite, rare carbonaceous material, rare iron oxide stains
2218-2235	17	Siltstone, locally shaly, medium to dark gray, red, brown, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; common biotite, common muscovite, rare carbonaceous material, rare iron oxide stains
2235-2270	35	Siltstone, locally shaly, medium to dark gray, red, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, ferruginous, with; common muscovite, rare carbonaceous material
2270-2295	25	Siltstone, locally finely sandy, medium gray(rare), red (rare), green, moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; common biotite, common muscovite, common iron oxide stains
2295-2315	20	Siltstone, light to medium gray, red, moderately hard, brittle, no apparent bedding, argillaceous, ferruginous, with; rare biotite, common muscovite, rare carbonaceous material, rare iron oxide stains
2315-2345	30	Shale, medium gray, moderately soft, flaky, good fissility, argillaceous, with; rare muscovite, common pyrite, rare iron oxide stains Contains common fragments of red Siltstone (contamination?)
2345-2383	38	Interbedded Shale, as in 2315-2345 Siltstone, locally finely sandy, light to medium gray, moderately hard, brittle, no apparent bedding, calcareous (slightly), siliceous, argillaceous, with; common biotite, common muscovite
2383-2412	29	Siltstone, shaly, dark gray, red, moderately hard, brittle, poor to fair fissility, argillaceous, with; rare muscovite, common carbonaceous material, rare iron oxide stains
2412-2436	24	Siltstone, locally shaly, light to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; common muscovite, rare pyrite, abundant carbonaceous material

2664-2698	34	Limestone, light to dark gray, light to dark brown, moderately hard, oolitic (locally) fragmental (brachiopod, crinoid) fossil content, no apparent bedding, cryptocrystalline to microcrystalline, common calcite
2698-2747	49	Limestone, dolomitic (slightly), light gray, light brown, tan, white, moderately hard, rare fragmental fossil content, no apparent bedding, cryptocrystalline, with; abundant calcite, rare iron oxide staining, X-ray diffraction check
2747-2777	30	Limestone, light to dark gray, light to dark brown, moderately hard, rare fragmental fossil content, no apparent bedding, cryptocrystalline, with; common calcite, common iron oxide staining
2777-2814	47	Limestone, light to dark brown, white, moderately hard, oolitic, fragmental fossil content, no apparent bedding, cryptocrystalline to microcrystalline, with; common calcite, rare carbonaceous material, common iron oxide staining
2814-2822	8	Limestone, dolomitic, light gray, moderately hard, oolitic (very), rare fragmental fossil content, no apparent bedding, microcrystalline, with; abundant calcite, coal carbonaceous material, rare iron oxide staining. Minor stringers of Siltstone, locally shaly, red, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, ferruginous, with; rare muscovite
2822-2900	78	Limestone, as in 2814-2822
2900-2921	21	Limestone, light brown, white, moderately hard, oolitic (locally), rare fragmental fossil content, no apparent bedding, cryptocrystalline to microcrystalline, with; common calcite, rare carbonaceous material
2921-2967	46	Limestone, light gray, white, moderately hard, rare fragmental fossil content, no apparent bedding, cryptocrystalline to microcrystalline, with; common chert, common calcite, rare carbonaceous material, rare iron oxide staining
2967-3040	73	Siltstone, red, maroon-drab, moderately hard, brittle, no apparent bedding, ferruginous, with; rare biotite, abundant muscovite
3040-3050	10	Siltstone, red, green-gray, moderately hard, brittle, no apparent bedding, argillaceous, ferruginous, with; rare biotite, common muscovite

2436-2442	6	Siltstone, as in 2412-2436, locally very finely sandy
2442-2445	3	Interbedded Sandstone, white, clear, moderately cemented, very fine to fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; rare biotite, rare muscovite, rare iron oxide stains. Nonporous to slightly porous. Siltstone, locally shaly, medium to dark gray, red, green, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; rare muscovite, common carbonaceous material
2445-2508	63	Sandstone, as in 2442-2445, with stringers of Siltstone, locally shaly, medium to dark gray, moderately soft, flaky, no apparent bedding to poorly fissile, argillaceous, with; rare muscovite, rare iron oxide stains
2508-2522	14	Shale, silty, medium gray to dark gray, moderately soft, flaky, fair to good fissility, argillaceous, with; common muscovite, rare pyrite, abundant carbonaceous material, abundant iron oxide stains
2522-2580	58	Interbedded Limestone, shaly, light to dark gray, moderately hard, common fragmental fossil content, no apparent bedding to platy, microcrystalline, abundant calcite, rare iron oxide staining. Shale, locally silty, dark gray, moderately soft, flaky, platy, argillaceous, with; rare muscovite, rare iron oxide stains
2580-2614	34	Limestone, light to dark gray, tan, white, moderately hard, common fragmental fossil content, no apparent bedding, cryptocrystalline, abundant calcite, rare iron oxide staining
2614-2616	2	No samples
2616-2631	15	Limestone, shaly, dark gray, light to dark brown, moderately hard, fragmental fossil content, platy, cryptocrystalline to microcrystalline, abundant calcite
2631-2664	33	Limestone, light to dark brown, moderately hard, oolitic, fragmental fossil content, no apparent bedding, microcrystalline, common calcite, rare iron oxide staining



3050-3084	34	Siltstone, grades to a very fine grained, Sandstone, locally finely sandy, light to medium gray, moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; common biotite, common muscovite, rare iron oxide stains
3084-3123	39	Siltstone, as in 3050-3084, locally shaly
3123-3195	72	Siltstone, as in 3050-3084
3195-3537	342	Shale, locally silty, medium to dark gray, brown (rare), moderately soft, flaky, good fissility, argillaceous, with; rare muscovite, rare pyrite, rare iron oxide stains
3537-3539	2	No samples
3539-3567	28	Shale, carbonaceous, black, moderately soft, flaky, fair to good fissility, argillaceous, with; rare muscovite, rare pyrite
3567-3580	18	Interbedded Sandstone, white, light gray, well cemented, very fine grained, well sorted, subrounded to subangular, interstitially silty, siliceous, with; rare biotite, rare muscovite, common iron oxide stains. Nonporous to slightly porous. Siltstone, locally shaly, carbonaceous (locally), light to dark gray, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; rare biotite, rare muscovite, common carbonaceous material, rare iron oxide stains
3580-3716	136	Interbedded Shale, medium to dark gray, moderately soft, flaky, fair to good fissility, argillaceous, with; rare muscovite, rare iron oxide stains. Siltstone, locally finely sandy, light to medium gray, moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; rare biotite, rare muscovite, rare carbonaceous material, common iron oxide stains
3716-3724	8	No samples
3724-3875	151	Siltstone, locally finely sandy, locally shaly, light to medium gray, moderately soft, flaky, no apparent bedding to poorly fissile, argillaceous, with; common biotite, abundant muscovite, rare carbonaceous material, rare iron oxide stains

3875-3905

30

Siltstone, locally finely sandy, medium gray, brown, moderately hard, brittle, no apparent bedding, argillaceous, with; rare biotite, rare muscovite, common pyrite, rare carbonaceous material

3905-4000

95

Interbedded Siltstone, grades to a very fine grained Sandstone, locally finely sandy, light gray, moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; common biotite, common muscovite, rare iron oxide stains. Shale, silty, medium to dark gray, moderately hard, brittle, poor to fair fissility, argillaceous, common muscovite, rare carbonaceous material

4000-4010

10

Siltstone, locally shaly, medium to dark gray, brown, moderately hard, brittle, no apparent bedding to poorly fissile, argillaceous, with; common biotite, common muscovite, common carbonaceous material, rare iron oxide stains

4010-4402

392

Interbedded Siltstone and Shale, as in 3905-4000

4402-4422

20

Shale, medium to dark gray, brown, moderately soft, flaky, fair to good fissility, argillaceous, with; rare biotite, rare muscovite, rare pyrite, common carbonaceous material, rare iron oxide stains

4422-4604

182

No samples

4606-4624

18

Interbedded Shale, light to dark gray, moderately soft, flaky, fair to good fissility, argillaceous, with; rare biotite, rare muscovite, common carbonaceous material. Siltstone, locally finely sandy, light to medium gray, light brown, moderately hard, brittle, no apparent bedding, argillaceous, with; common biotite, common muscovite

4624-4650

26

Interbedded Siltstone, locally finely sandy, light to medium gray, brown, moderately hard, brittle, no apparent bedding, siliceous, argillaceous, with; rare biotite, rare muscovite. Shale, carbonaceous, black, soft, flaky, good fissility, argillaceous, with; rare muscovite

4650-4682	32	Interbedded Shale, light to medium gray, moderately soft, flaky, fair to good fissility, argillaceous, with; rare muscovite, abundant pyrite, rare carbonaceous material, Siltstone, locally finely sandy, light to medium gray, brown, moderately hard, brittle, no apparent bedding, argillaceous, with; rare biotite, rare muscovite, common pyrite, rare carbonaceous material, rare iron oxide stains
4682-4695	13	Shale, carbonaceous, black, moderately soft, flaky, good fissility, argillaceous, with; rare muscovite, common pyrite, rare iron oxide stains
4695-4770	75	Interbedded; Shale, carbonaceous, as in 4682-4695 with; Shale, locally silty, light to medium gray, moderately hard, brittle, poor to fair fissility, argillaceous, with; rare muscovite, common pyrite
4770-4850	80	Shale, carbonaceous, as in 4682-4695, with; Minor stringers of Shale, as in 4695-4770
4850-4905	55	Interbedded; Lithologies as in 4695-4770
4905-4934	29	Shale, brown-gray, soft, flaky, good fissility, argillaceous, with; abundant muscovite, common pyrite, rare carbonaceous material
4934-4960	26	Shale, locally carbonaceous, light to dark gray, moderately soft, flaky, fair to good fissility, argillaceous, with; common muscovite, common pyrite
4960-4997	37	Interbedded; Shale, as in 4934-4960, with; Shale, carbonaceous, black, soft, flaky, good fissility, argillaceous, with; rare muscovite
4997-5047	50	Shale, light gray, moderately soft, flaky, fair to good fissility, argillaceous, with; rare biotite, common muscovite, rare carbonaceous material, rare iron oxide stains
5047-5057	10	No samples
5057-5067	10	Shale, as in 4997-5047
5067-5098	31	No samples
5098-5209	111	Shale, locally silty, light to medium gray, brown, moderately soft, flaky, fair to good fissility, argillaceous, calcareous (locally very slightly), with; rare muscovite, rare carbonaceous material, rare iron oxide stains

5209-5218

9

Interbedded Shale, as in 5098-5209  
Shale, carbonaceous, black, moderately  
soft, flaky, fair to good fissility,  
argillaceous, with; rare muscovite,  
abundant pyrite

5218-5250

32

No samples

5250' - T.D.

## GEOLOGIC SUMMARY

## Pennsylvanian System

Norton Formation	in	290
	bottom	793
Lee Formation	top	793
	bottom	1564

## Mississippian System

Bluestone Formation	top	1564
	bottom	1877
Princeton Sandstone	top	1877
	bottom	2044
Hinton Formation	top	2044
	bottom	2315
Stony Gap Sandstone	top	2166
	bottom	2315
Bluefield Formation	top	2315
	bottom	2522
Greenbrier Limestone	top	2522
	bottom	2967
Maccrady-Price Formations	top	2967
	bottom	3195

## Mississippian-Devonian Systems

Big Stone Gap Shale	top	3195
	bottom	3567

## Devonian - Pre-Devonian Systems

Devonian - Pre-Devonian undivided	top	3567
	(deepest sample	5218)