

Operator: Clinchfield Coal Company  
 Farm: Virginia Coal & Iron Company  
 Well No: 143  
 Location: Wise County  
           13,000' S. of 37° 05'  
           10,900' W. of 82° 40'  
 Elevation: 2225.3'  
 Total Depth: 5349'  
 Drilling Commenced: November 6, 1952  
 Well Completed: July 10, 1953  
 Result: Gas Well

VDMR Well No. 146  
 Geologic log  
 Samples studied and described  
 by K. Robinson  
 Virginia Division of  
 Mineral Resources  
 April 1962

GEOLOGIC LOG

<u>Depth (feet)</u>	<u>Thickness</u>	<u>Lithology</u>
<u>PENNSYLVANIAN SYSTEM</u>		
<u>Wise Formation (0' - ?)</u>		
<u>Gladeville Sandstone (? - ?)</u>		
0' - 2170'	2170'	No sample
<u>Norton Formation</u>		
( ? - 2238' )		
2170' - 2195'	25'	Sandstone, white, moderately hard to friable, fine-to very coarse-grained, poorly sorted, generally well rounded, siliceous and slightly calcareous with common coal fragments and rare chlorite. Possible fair to poor porosity.
2195' - 2238'	43'	Siltstone, light to medium and dark gray, gray-brown and brown, predominantly medium gray, moderately hard, locally very finely sandy, siliceous with abundant mica and carbonaceous material. Common fine coaly carbonaceous laminae.
<u>Lee Formation</u>		
(2238' - 2933')		
2238' - 2250'	12'	Sandstone, light gray, hard, very fine to fine- and silty grained, well sorted, interstitially very silty, siliceous with abundant mica and carbonaceous material. No apparent porosity. Estimated 3' Coal bed in the interval 2244' - 2250'.
2250' - 2260'	10'	Sandstone, white, hard to friable, fine-to-coarse- and rarely very coarse-grained, poorly sorted, angular to round, siliceous and slightly calcareous with mica and chlorite. Estimated 3'-5' Coal bed in the interval 2250' - 2260'.

2260' - 2280'	20'	Sandstone, white, moderately hard to friable, medium-to fine-grained, moderate sorting, angular to round, interstitially slightly silty, siliceous and slightly calcareous with mica and chlorite. Possible fair porosity. Estimated 1' Coal bed in the interval 2260' -2270'
2280' - 2290'	10'	No sample.
2290' - 2310'	20'	Sandstone, medium-grained, very well sorted, angular to well rounded, as above.
2310' - 2320'	10'	No sample.
2320' - 2325'	5'	Sandstone, as 2250' - 2260'. Estimated 2' Coal bed with impure coaly carbonaceous siltstone in this interval.
2325' - 2350'	25'	Sandstone, white, moderately hard to friable, medium-grained, very well sorted, subround to well rounded, interstitially silty, siliceous with common mica. Possible fair porosity. Estimated 4' Coal bed 2333' - 2337', with impure coaly carbonaceous siltstone.
2350' - 2355'	5'	Siltstone, medium to dark gray and gray-brown, moderately hard, locally finely sandy, siliceous with abundant carbonaceous material, mica and fine laminae of impure coal.
2355' - 2406'	51'	Sandstone, white, moderately hard to friable, fine to medium and coarse grained, variable, poor to well sorted, angular to well rounded, siliceous, with mica and chlorite. Probable good porosity.
2406' - 2421'	15'	Siltstone, medium to dark gray, moderately hard, siliceous, locally argillaceous and sandy stringers, with abundant carbonaceous material and mica. Estimated 2' of interbedded lenses and laminae of Coal, locally impure, argillaceous and silty, 2416' - 2418'.
2421' - 2458'	37'	Sandstone, white, moderately hard, fine to medium and coarse grained, variable, generally well sorted, angular to round, interstitially locally silty, siliceous, possible fair porosity. Estimated 3'-5' coal bed, impure, argillaceous and silty at 2425' - 2430' with associated Siltstone as above. Possible thin laminae of impure coal and siltstone throughout.
2458' - 2489'	31'	Sandstone, white, moderately friable, very fine - to fine -, medium - and coarse-grained, very poorly sorted, angular to round, interstitially silty, siliceous with common mica and carbonaceous material. Slight to

possible fair porosity. Possibly conglomeratic?

2489' - 2500'	11'	Siltstone, medium to dark gray, hard, locally very finely sandy, siliceous and slightly calcareous with abundant carbonaceous material.
2500' - 2535'	35'	Shale, coaly carbonaceous, dark gray, moderately hard, slightly fissile with carbonaceous material and mica.
2535' - 2545'	10'	No sample.
2545' - 2551'	6'	Shale, coaly carbonaceous as above with interbedded coal lenses.
2551' - 2555'	4'	Siltstone, light to medium gray, hard, locally finely sandy, siliceous with abundant carbonaceous material.
2555' - 2565'	10'	No sample.
2565' - 2566'	1'	Sandstone, white, hard, fine to small pebble grained, probably conglomeratic, subround to round, interstitially silty, siliceous with common carbonaceous material. Fair porosity.
2566' - 2568'	2'	Coal
2568' - 2572'	4'	Shale, medium gray to gray-brown, moderately hard and fissile with abundant carbonaceous material.
2572' - 2588'	16'	Shale, coaly carbonaceous, dark gray, moderately hard, slightly fissile with finely divided mica. Common thin lenses or laminae of coal.
2588' - 2604'	16'	Sandstone, white, moderately hard, fine to granular grained, very poorly sorted, possibly conglomeratic, angular to round, slightly silty, siliceous. Probable fair to good porosity.
2604' - 2617'	13'	No sample
2617' - 2626'	9'	Sandstone, white, moderately hard, fine to generally medium and rarely coarse-grained, moderate sorting, angular to round, interstitially silty, siliceous. Poor to possible fair porosity.
2626' - 2632'	6'	Sandstone, fine to granular-grained, very poorly sorted, possibly conglomeratic, as above. Estimated thin interbedded impure coal lenses.

2632' - 2674'	42'	Sandstone, subround to round, as 2617' - 2626' with estimated thin coal lenses and carbonaceous shale stringers throughout.
2674' - 2684'	10'	Sandstone, medium to fine grained, well sorted with mica and chlorite as above.
2684' - 2693'	9'	Sandstone, very fine to granular-grained with impure coal lenses as 2626' - 2632'.
2693' - 2710'	17'	Sandstone, as 2632' - 2674'.
2710' - 2720'	10'	No sample.
2720' - 2730'	10'	Sandstone as 2693' - 2710'.
2730' - 2749'	19'	Sandstone, white, soft, very fine to fine-grained, well sorted, angular to subangular, silty, siliceous. Possible fair porosity.
2749' - 2757'	8'	No sample.
2757' - 2764'	7'	Siltstone, light to medium gray, hard, locally sandy conglomeratic, fine to pebbly grained, siliceous with abundant mica and coaly carbonaceous material, common pyrite.
2764' - 2767'	3'	Sandstone, conglomeratic, white, hard, fine to pebbly grained, poorly sorted, angular to round, silty, siliceous with carbonaceous material.
2767' - 2789'	22'	Sandstone, white, moderately hard, medium, commonly fine to granular-grained, moderate sorting, angular to round, slightly silty, siliceous. Possible fair to poor porosity.
2789' - 2795'	6'	Sandstone, predominantly fine-grained, well sorted, as above.
2795' - 2809'	14'	No sample
2809' - 2831'	22'	Sandstone, fine to medium grained, well sorted, as above.
2831' - 2837'	6'	No sample.
2837' - 2933'	96'	Sandstone, white, moderately hard to friable, variable very fine to coarse, predominantly medium grained, commonly very coarse to granular, rarely pebbly, conglomeratic, generally well sorted to locally very poor, subangular to round, silty, siliceous. Fair to poor porosity.

MISSISSIPPIAN SYSTEM

Pennington Group (2933' - 2544')

Bluestone Formation (2933' - 3090')

- |               |     |   |
|---------------|-----|---|
| 2933' - 2937' | 4'  | Siltstone, light to dark gray, hard, locally finely sandy, siliceous with abundant carbonaceous material and mica.  |
| 2937' - 2955' | 18' | Siltstone, light to medium gray, rarely brown, moderately hard, locally very finely sandy, siliceous, very slightly calcareous with finely divided coaly carbonaceous material. |
| 2955' - 2990' | 35' | Siltstone, medium gray, as above.   |
| 2990' - 2996' | 6'  | No sample.  |
| 2996' - 3070' | 74' | Siltstone, medium gray, as 2955' - 2990', becoming calcareous and argillaceous.   |
| 3070' - 3090' | 20' | Siltstone, argillaceous, medium gray, moderately hard, siliceous and very calcareous with carbonaceous material.  |

Princeton Sandstone (3090'? - 3151')

- |               |     |   |
|---------------|-----|---|
| 3090' - 3151' | 61' | Interbedded Siltstone, light to medium gray, moderately hard, slightly argillaceous, siliceous, very slightly calcareous with abundant coaly carbonaceous material and mica. Sandstone, white to medium gray, hard, very fine to fine grained, well sorted and rounded, interstitially very silty, siliceous, very slightly calcareous with common pyrite and carbonaceous material. No apparent porosity. Common laminae of silty impure coal or carbonaceous material throughout. |
|---------------|-----|---|

Hinton Formation (3151' - 3544')

Avis Limestone Member (3151' - 3165'?)

- |               |    |   |
|---------------|----|---|
| 3151' - 3159' | 8' | Limestone, white to light gray and tan, hard, microcrystalline with common fossil fragments.  |
| 3159' - 3165' | 6' | Shale, calcareous, greenish-gray to medium-gray, moderately hard and fissile, locally silty with common finely divided carbonaceous material. |

Middle Red Member (3165' - 3348)

3165' - 3210'	45'	Interbedded variegated Siltstone, red-brown, green and greenish-gray, ferruginous, moderately hard, locally very finely sandy, siliceous. Shale, red-brown and greenish-gray, ferruginous, moderately hard and fissile, locally silty, calcareous.
3210' - 3215'	5'	Siltstone, light gray, hard, very finely sandy, siliceous, slightly calcareous with rare finely divided carbonaceous material.
3215' - 3282'	67'	Siltstone, variegated, calcareous, ferruginous, red-brown, brown, mauve, green and greenish-gray, mottled, moderately hard, locally very finely sandy and argillaceous. Common interbedded variegated shale and limestone stringers.
3282' - 3303'	21'	Siltstone, light to medium gray, very rarely red-brown, ferruginous, moderately hard, brittle, slightly fissile, very finely sandy, siliceous, locally argillaceous and slightly calcareous, with abundant finely divided carbonaceous material.
3303' - 3308'	5'	Limestone, dolomitic, light gray to brown, very hard, dense, cryptocrystalline with common siliceous veining.
3308' - 3329'	21'	Siltstone, calcareous, variegated red-brown, brown, green and greenish-gray, as 3215' - 3282'.
3329' - 3348'	19'	Siltstone, generally light to medium gray, also greenish-gray, green, brownish-gray and rarely red-brown, mottled, very hard, siliceous and very slightly calcareous with rare carbonaceous material. Fine intercolated laminae of dolomitic limestone as above.
<u>Stony Gap Sandstone Member</u> (3348' - 3544')		
3348' - 3396'	48'	Sandstone, white, hard, very fine to fine-grained, well sorted, subangular to round, interstitially silty, siliceous with common finely divided carbonaceous material, chlorite and mica. Common fine laminae or partings of impure coaly carbonaceous material.
3396' - 3406'	10'	Siltstone, light to medium gray and greenish-gray, hard, siliceous with abundant laminae and finely divided coaly carbonaceous material.
3406' - 3422'	16'	Sandstone as 3348' - 3396', with common impure silty coal partings.

3422' - 3442'	20'	Interbedded Sandstone as above and Siltstone, light to dark gray, greenish-gray and gray-brown, hard, siliceous and slightly calcareous with common finely divided carbonaceous material, mica and pyrite. Common laminae of coaly carbonaceous material. Estimated thin Coal lenses throughout.
3442' - 3507'	65'	Sandstone, white, moderately hard, fine to very fine-grained, well sorted, subangular to round, interstitially very slightly silty, siliceous grading to very slightly calcareous, with rare finely divided carbonaceous material. Possible fair to poor porosity.
3507' - 3544'	37'	Interbedded Sandstone, white to light gray, moderately hard, fine to medium-grained, well sorted, angular to round, interstitially locally silty, siliceous, very slightly calcareous with mica and carbonaceous material. Siltstone, medium to dark gray, moderately hard and brittle, locally finely sandy, siliceous with abundant mica and carbonaceous material. Common fine laminae of micaceous coaly carbonaceous material.
<u>Bluefield Formation</u>		(3544' - 3740')
3544' - 3584'	40'	Siltstone, light to dark gray, greenish gray and rarely red-brown, very hard, siliceous and calcareous with locally common finely divided mica and carbonaceous material.
3584' - 3730'	146'	Siltstone, medium gray, hard, siliceous and slightly calcareous with common finely divided carbonaceous material and fossil fragments. Interbedded Sandstone stringers as above 3647' - 3680'.
3730' - 3740'	10'	Siltstone, very calcareous, fossiliferous fragmental, medium gray, hard, locally finely sandy, siliceous with abundant finely divided carbonaceous material, calcite and fossil fragments.
<u>Greenbrier Limestone</u>		(3740' - 4165')
3740' - 3764'	24'	Limestone, very silty, argillaceous, white to medium gray, tan and brown, hard, microcrystalline with abundant calcite, carbonaceous material and fossil fragments. Very common interbedded Siltstone as above.
3764' - 3819'	55'	Limestone, silty, white to medium gray, tan and brown, very hard, microcrystalline, commonly fossiliferous fragmental and oolitic. Probable interbedded calcareous siltstone. Common Chert fragments 3809' - 3819'.

3819' - 3828'	9'	Siltstone, calcareous, medium gray, hard, finely sandy with fossil fragments, carbonaceous material and calcite.
3828' - 3848'	20'	Limestone, silty, fossiliferous fragmental and oolitic as above. Common chert.
3848' - 3852'	4'	Siltstone as 3819' - 3828'.
3852' - 3866'	14'	Limestone, silty, fossiliferous fragmental and oolitic as above. Common chert and siltstone fragments.
3866' - 4085'	219'	Limestone, white to medium gray, gray-brown, brown and tan, hard, microcrystalline, generally oolitic, variable common to rare fossiliferous fragmental.
4085' - 4112'	27'	Limestone, white, oolitic and fossiliferous fragmental.
4112' - 4165'	53'	Limestone, white to light gray and tan, hard, brittle, microcrystalline, locally very finely silty, rarely oolitic. Common chert 4142' - 4165'.
<u>MacCrady Shale</u>		(4165' - 4200')
4165' - 4168'	3'	Sandstone, light gray, moderately hard, very fine-grained, well sorted, silty, siliceous and calcareous. Poor porosity.
4168' - 4190'	22'	Siltstone, calcareous, light to medium gray, greenish gray and green, commonly red-brown, hard, brittle, locally very finely sandy, siliceous with common finely divided carbonaceous material.
4190' - 4200'	10'	Limestone, tan, hard, brittle, microcrystalline, locally very finely silty, rarely oolitic.
<u>Price Formation</u>		(4200' - 4373')
4200' - 4219'	19'	Siltstone, light to medium and greenish gray, hard, brittle, locally very finely sandy, siliceous, slightly calcareous with abundant finely divided carbonaceous material.
4219' - 4236'	17'	Sandstone, white to light gray, hard, very fine to silty grained, well sorted, siliceous, with abundant mica, and finely divided carbonaceous material. Abundant fine laminae or coaly carbonaceous partings.
4236' - 4275'	39'	Sandstone as 4219' - 4236' with minor interbedded Siltstone as 4200' - 4219'.



4275' - 4291'	16'	Sandstone, white to light gray and gray-brown, hard, very fine to abundantly silty grained, well sorted and rounded, interstitially siliceous and slightly calcareous with common to abundant finely divided carbonaceous material and mica. Poor porosity.
4291' - 4295'	4'	Siltstone as 4200' - 4219'.
4295' - 4304'	9'	Sandstone as 4275' - 4291'.
4304' - 4373'	69'	Siltstone, light to medium gray and gray-brown, hard, locally very finely sandy, siliceous, slightly calcareous with abundant finely divided carbonaceous material and mica. Minor interbedded Sandstone as 4275' - 4291'.

MISSISSIPPIAN SYSTEMS

Devonian-Mississippian Shales and Siltstones (4373' - 5338')

4373' - 4421'	48'	Siltstone, argillaceous, medium to dark gray, hard, slightly fissile, rarely very finely sandy, siliceous with common mica and pyrite, and abundant finely divided carbonaceous material.
4421' - 4444'	23'	No sample.
4444' - 4489'	45'	Siltstone, argillaceous as above.
4489' - 4541'	52'	Siltstone, argillaceous, dark gray, hard, brittle, slightly fissile, siliceous and slightly calcareous with very abundant coaly carbonaceous material, common mica and finely disseminated pyrite.
4541' - 4549'	8'	No sample.
4549' - 4606'	57'	Siltstone, light to medium gray, very hard, locally very finely sandy, siliceous with abundant finely divided carbonaceous material, mica and pyrite. Common coaly carbonaceous laminae.
4606' - 4688'	82'	Siltstone, carbonaceous, dark gray to black, hard, brittle, poorly fissile, siliceous with abundant finely divided carbonaceous material, common mica and pyrite. Rare calcite veins 4644' - 4658'.
4688' - 4778'	90'	Siltstone, light to medium gray, moderately hard, slightly fissile and argillaceous, siliceous, with common finely divided carbonaceous material, mica and pyrite. Common partings or laminae of coaly carbonaceous material.

4778' - 4820'	42'	Siltstone, carbonaceous as 4606' - 4688'.
4820' - 4950'	130'	Siltstone, light to medium and dark gray, rarely brown, hard, brittle, siliceous, very rarely slightly calcareous, with abundant carbonaceous material, common mica and rare finely disseminated pyrite. Common partings or laminae of impure, silty, coaly carbonaceous material.
4950' - 5002'	52'	Siltstone, argillaceous, medium gray, moderately hard, brittle, slightly fissile, siliceous, very slightly calcareous with abundant finely divided carbonaceous material, common mica and pyrite. Abundant coaly carbonaceous laminae.
5002' - 5035'	33'	Siltstone, medium to dark gray, moderately hard, slightly fissile and argillaceous, siliceous, with abundant carbonaceous material and common mica. Common coaly carbonaceous laminae.
5035' - 5043'	8'	No sample.
5043' - 5075'	32'	Siltstone as 5002' - 5035'
5075' - 5124'	49'	Siltstone, medium to dark gray, moderately hard, slightly fissile, siliceous with abundant finely carbonaceous material, common mica and pyrite. Common coaly carbonaceous laminae.
5124' - 5147'	23'	Siltstone, carbonaceous, black, hard, brittle, siliceous with abundant carbonaceous material, common pyrite and mica. Estimated total 4' Coal bed or beds in this interval.
5147' - 5152'	5'	Siltstone, light to medium gray, moderately hard, slightly fissile and argillaceous, siliceous with common to abundant finely divided carbonaceous material, mica and pyrite.
5152' - 5175'	23'	No sample.
5175' - 5196'	21'	Siltstone, light to medium gray as 5147' - 5152'
5196' - 5211'	15'	Siltstone, dark gray, moderately hard, slightly argillaceous, siliceous with abundant carbonaceous material, common mica and pyrite. Estimated 1' impure argillaceous coal bed in the interval 5205' - 5211'.

5211' - 5276'	65'	Siltstone, light to medium gray, moderately hard and brittle, poorly fissile, slightly argillaceous, siliceous with abundant carbonaceous material and pyrite.
5276' - 5305'	29'	Siltstone, medium to dark gray, as above.
5305' - 5318'	13'	No sample.
5318' - 5338'	20'	Siltstone, carbonaceous, black, hard, brittle, slightly argillaceous, siliceous with abundant carbonaceous material and common pyrite.

Devonian "Helderberg Limestone" (5338' - 5349'+)

5338' - 5349'	11'	Limestone, white to tan, hard, brittle, microcrystalline, slightly silty with abundant calcite and common pyrite. Very abundant Chert, milky white, blue and brown.
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TOTAL DEPTH 5349'

SUMMARY

Pennsylvanian  
System  
(0' - 2933')

Pottsville Group  
(0' - 2933')

Wise Formation  
(0' - ?)

Gladeville Sandstone  
(? - ?)

Norton Formation  
(? - 2238')

Lee Formation  
(2238' - 2933')

Bluestone Formation  
(2933' - 3090')

Pennington Group  
(2933' - 3544')

Princeton Sandstone  
(3090' - 3151')

Avis Limestone  
Member (3151'-3165'?)

Hinton Formation  
(3151' - 3544')

Middle Red Member

(3165'-3348')

Stony Gap Sandstone

Member (3348' - 3544')

Mississippian  
System  
(2933' - 4373')

Bluefield Formation  
(3544' - 3740')

Greenbrier Limestone  
(3740' - 4165')

MacGrady Shale  
(4165' - 4200')

Price Formation  
(4200' - 4373')

Devonian-Mississippian

Systems (4373' - 4338') Devonian-Mississippian Shales and Siltstones (4373' - 5338')

Devonian "Helderberg Limestone"

(5338' - 5349')

## GEOLOGIC SUMMARY

## Pennsylvanian System

Norton Formation	in	2170 (?)
	bottom	2238
Lee Formation	top	2238
	bottom	2933

## Mississippian System

Bluestone Formation	top	2933
	bottom	3090 (?)
Princeton Sandstone	top	3090 (?)
	bottom	3151
Hinton Formation	top	3151
	bottom	3544
Stony Gap Sandstone	top	3348
	bottom	3544
Bluefield Formation	top	3544
	bottom	3740
Greenbrier Limestone	top	3740
	bottom	4165
Maccrady-Price Formations	top	4165
	bottom	4373

## Mississippian-Devonian Systems

Big Stone Gap Shale	top	4373
	bottom	4688

## Devonian - Pre-Devonian Systems

Devonian - Pre-Devonian undivided	top	4688
	(sampled depth	5349)