

OPERATOR: Columbia Gas Transmission Corporation  
FARM: Pittston Company  
WELL NO. 20553  
LOCATION: Buchanan County  
12,650' S of 37° - 15'  
3,600' W of 82° - 12' - 30"  
ELEVATION: 1783.82' GR.  
TOTAL DEPTH: 4790'  
DRILLING COMMENCED: November 17, 1978  
WELL COMPLETED: April 16, 1979  
RESULT: Gas Well

Bu 174

WELL LOG

DEPTH  
(feet)

0-100 No samples.

100-130 Siltstone - medium gray (N5); highly variable sandy siltstone; fissile; micaceous on partings and 5%; grading or interbedded with Sandstone, silty - medium gray; fine to coarse, poorly sorted, subrounded clear grains; micaceous; brittle; soft in lighter fragments; slight porosity and (1%) sandstone - light gray (N7); coarse grained with green/brown micas.

130-160 As 100-130; iron oxide particles and staining.

160-190 As 130-160.

190-220 As 130-160.

220-250 Sandstone (crushed) - light gray (N7), medium to very coarse grained, moderately sorted, subrounded; soft; 5% micaceous - muscovite; "green and brown;" iron stains; probably clay cement.

250-280 As 220-250.

280-310 Sandstone - as 220-250; (1%); harder; (20%) siltstone (grayish black (N2)); carbonaceous; micaceous; fossil - coal "stem"/plant.

310-340 As 280-310; no fossils.

340-370 As 280-310; sandstone fine to medium grained and grading to medium gray (N5) in places; "green mica"; coal - sandy fragments.

370-400 Sandstone - medium gray (N5) and medium light gray (N6), fine to medium, poor sorting, subrounded clear grains; feldspathic; micaceous; hard to brittle; iron particles; coal - plant fragments and fragments "sandy" coal.

400-430 Shale - medium dark gray (N4); hard; fissile; micaceous.

OWNER: Columbia Gas Transmission Corp.

W# 20553

DEPTH  
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430-460 Sandstone, crushed - as 220-250.

460-490 Shale - as 400-430.

490-520 Sandstone, crushed - as 220-250; 20% shale as 400-430.

520-550 Siltstone, sandy - medium gray (N5), hard; fine to medium quartz grains; slightly micaceous.

550-580 As 520-550; medium dark gray; not sandy.

580-610 As 550-580.

610-640 As 520-550; calcareous; slickensides; very sparse fragments of sandstone - light gray, coarse, poorly sorted, subrounded.

640-670 Sandstone - light gray (N7.5), medium to granule, poorly sorted, subrounded clear grains of quartz; clay cement; grains of calcite; iron oxide fragments and stains; and siltstone - medium dark gray - hard; micaceous.

670-700 As 640-670; "green" mineral; white mica - green and brown.

700-730 As 670-700; white saprolitic feldspar(?); pyrite.

730-760 Siltstone - medium dark gray (N4); hard; micaceous; and 1-3% sandstone - light gray.

760-790 As 730-760; iron stains.

790-820 Siltstone/Sandstone - interbedded as 730-760 and 640-670.

820-850 As 790-820.

850-880 As 790-820.

880-910 As 790-820; iron grains.

910-940 As 790-820.

940-970 As 790-820.

970-1000 As 790-820; 2/3 siltstone.

1000-1030 As 790-820; coal.

1030-1060 As 790-820; coal; 2/3 sandstone and is slightly calcareous; siltstone finer grained, some almost shale; feldspar; mica.

1060-1090 Siltstone  $\pm$  medium dark gray (N4), hard; micaceous; and (1%) sandstone; slightly calcareous.

OWNER: Columbia Gas Transmission Corp.

W# 20553

DEPTH  
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- 1090-1120 As 1060-1090.
- 1120-1150 Sandstone, crushed - "white" (5Y 8/1), very fine to coarse, moderate sorting, subrounded clear grains; clay cement; sparse muscovite; and 1% fine siltstone fragments - as 1060-1090.
- 1150-1180 As 1120-1150.
- 1180-1210 As 1120-1150.
- 1210-1240 As 1120-1150.
- 1240-1270 As 1120-1150; coal; glauconite particle; saprolitic feldspar; iron particles.
- 1270-1300 As 1120-1150; feldspar; 3% siltstone.
- 1300-1333 As 1120-1150; scattered angular granule-size fragments from larger pieces of quartz.
- 1330-1360 As 1120-1150.
- 1360-1390 As 1120-1150; coal.
- 1390-1420 Sandstone, crushed, shaly - light gray (N7.5), medium grained, well sorted, subrounded clear grains; calcareous; rarely micaceous; hard - grading into "dirty" sandy siltstone with mica and calcite fragments - to (20%) siltstone, dark gray, fine grained and (3%) shale - dark gray (N3); hard; fissile; occasionally sandy.
- 1420-1450 Siltstone - as 1390-1420; 70% siltstone; 30% sandstone; some calcareous, some fragments not and of lighter gray; micaceous.
- 1450-1480 Sandstone/Siltstone - interbedded; 80% sandstone; 20% siltstone as 1420-1450; feldspar; hydro-muscovite; 1-3% grayish brown "dirty" sandstone; coal and carbonaceous sandstone/siltstone.
- 1480-1510 As 1450-1480; 10% siltstone/shale; no coal/carbon.
- 1510-1540 As 1450-1480; very sparse local calcite; 20% siltstone/shale.
- 1540-1570 As 1450-1480; 10% siltstone/shale.
- 1570-1600 As 1450-1480.
- 1600-1630 Siltstone - medium dark gray (N4); hard; micaceous; and 15% sandstone - medium light gray (N6); medium grain, moderate sorting, subrounded clear grains, "dirty;" micaceous.

OWNER:

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W# 20553

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1630-1660 Sandstone (50%)/Siltstone (50%), interbedded - siltstone as 1600-1630; sandstone as 1390-1420; clean and "dirty."

1660-1690 As 1630-1660; 20% siltstone; iron particles.

1690-1720 As 1630-1660; 5% siltstone.

1720-1750 Siltstone - as 1600-1630; carbonaceous plant fossil fragments.

1750-1780 As 1720-1750.

1780-1810 Sandstone, crushed - medium gray (N5); fine to coarse, poorly sorted, angular to subrounded clear grains; hard and (25%±) siltstone - as 1600-1630; rarely micaceous.

1810-1840 Sandstone/Siltstone, interbedded - sandstone "white" (5Y 6/1); fine to coarse, moderate sorting, subangular clear grains; rare mica and saprolitic feldspar and 25% siltstone, medium dark gray (N4); hard; iron grains.

1840-2140 No samples.

2140-2170 Shale - medium dark gray (N4), hard; and (1%) shale, grayish red (10R 4/2); and (40%) sandstone, crushed, light olive gray (5Y 6/1); fine grained, well sorted, subangular, clear; locally calcareous; iron particles and (1%) grayish green shale; hard, coarse.

2170-2180 No sample.

2180-2210 Sandstone/Shales - as 2140-2170.

2210-2270 No samples.

2270-2300 Shales - medium gray (N5); grayish green and grayish red (10R 4/2), hard, fissile; and slightly calcareous; (1%) siltstone, greenish gray (5GY 6/1), fine grained, moderate sorting, subrounded.

2300-2330 As 2270-2300; 40% red shales; 60% gray and gray-green.

2330-2360 Shale - greenish gray (5GY 6/1); hard, fissile; locally calcareous; and 1% reddish gray shale.

2360-2390 Shale - medium gray (N5); soft to hard, fissile; sparse iron particles; not calcareous.

2390-2420 Shale - medium and medium light gray (N4, N5), as 2360-2390; and fragments iron stained sandstone, very coarse grained, poorly sorted, angular grains; feldspar and mica; clay cement?

OWNER:

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W# 20553

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- 2420-2450 Siltstone (60%) - medium gray (N5) and (40%) light greenish gray (5GY 7/1); interbedded - hard; some micaceous; grain sizes of quartz and percentage varies into fine grained sandstone - very sparse small fragments.
- 2450-2480 As 2420-2450; iron grains.
- 2480-2510 Shale - dark gray (N3); hard; fissile; locally calcareous and (1%) siltstone - light gray (5GY 7/1), as 2420-2450.
- 2510-2540 As 2480-2510; dark gray only.
- 2540-2570 As 2510-2540.
- 2570-2600 As 2510-2540; calcareous.
- 2600-2630 Shale - dark greenish gray (5GY 4/1); hard; fissile; calcareous; iron particles.
- 2630-2660 Limestone - medium gray (N5); cryptograined; some locally argillaceous; scattered quartz grains; fragments of dark gray shale.
- 2660-2690 Shale - medium gray (N5), hard; fissile; calcareous and 3% limestone fragments.
- 2690-2720 Limestone, argillaceous - as 2630-2660; some calcite fragments; and shale - dark gray (N3) fragments.
- 2720-2750 As 2690-2720; fossil fragments.
- 2750-2780 As 2690-2720; calcite in crack fillings; pyrite; fossils - brachiopods.
- 2780-2810 Sandstone - medium gray in fragments (N5.5) and white in grains; fine to medium, moderate to well sorted, subrounded clear and grayish green quartz grains; siliceous; hard; clear or "white" grains are soft; moderate porosity; mica; and 1-3% shales, reddish gray and black, and iron particles.
- 2810-2840 As 2780-2810; lesser amounts of shale; calcareous; pyrite.
- 2840-2870 As 2780-2810; 40% "white", loose, medium to granule sized sandstone.
- 2870-2900 As 2780-2810; 15% red shale; sandstone is calcareous; calcite fragments; no "white" sandstone.
- 2900-2930 Sandstone and Siltstone - as 2870-2900; (10%±) siltstone - dark to medium gray - dense, fine grained, hard.

OWNER:

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W# 20553

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2930-2960 As 2900-2930.

2960-2990 As 2900-2930; sparse white sandstone.

2990-3020 As 2840-2870; with (3%±) siltstone as 2900-2930; and local pyrite and mica; very sparse local calcareousness.

3020-3050 As 2990-3020.

3050-3080 As at 2840-2870; 60% white sandstone; rest is mixed (20%) greenish gray sandstone; (10%) dark gray siltstone; (1) red shale.

3080-3090 Limestone, argillaceous - medium dark gray (N4), micrograined; fossiliferous and (35%) sandstone - white, as 2840-2870; 1-3% siltstone, dark gray (N5); hard; iron oxide fragments.

3090-3100 As 3050-3080; 80% white sandstone (fine grained, well sorted; calcareous).

3100-3110 Sandstone - grayish orange pink (5YR 7/2); "white" or light yellowish orange - very fine to fine, well sorted, subangular to subrounded; argillaceous; calcareous; iron fragments and very sparse red/black shale fragments.

3110-3120 As 3100-3110.

3120-3130 As 3100-3110.

3130-3140 Sandstone - light olive gray (5Y 5/1); very fine to coarse grained, moderate to poor sorting; subangular and subrounded clear quartz grains; "white" ?calcareous clay with "white" sandstone; siliceous in greenish (? or siltstone/shale, calcareous) gray sandstone fragments; 10% small sandstone (greenish gray) fragments; 25% siltstone/shale - dark gray; hard; micaceous; and iron (oxide) grains/stains.

3140-3150 As 3130-3140; 40%± shale, dark gray.

3150-3160 As 3130-3140; but light olive gray (5Y 6/1) and white sandstone only; 1% fine shale fragments.

3160-3170 As 3130-3140; iron grains; sandstone has rounded grains.

3170-3180 As 3130-3140.

3180-3190 As 3130-3140.

3190-3200 As 3130-3140; 20% shale - dark gray.

OWNER:

Columbia Gas Transmission Corp.

W# 20553

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3200-3210 As 3130-3140; 20% shale; more ground "clay;" calcareous.

3210-3220 As 3200-3210.

3220-3230 As 3200-3210.

3230-3240 No sample.

3240-3250 Siltstone - medium dark gray (N4); hard; carboniferous - plant remains; shale fragments - red, black; and greenish gray sandstone fragments; pyrite; iron fragments.

3250-3260 As 3240-3250; 1% "white" sandstone - loose grains.

3260-3270 Siltstone/Sandstone, interbedded - as 3240-3250; (40%+) sandstone - "white."

3270-3280 Shale - dark gray (N3); hard; calcareous; sparsely fossiliferous; and iron grains.

3280-3290 As 3270-3280.

3290-3300 As 3270-3280.

3300-3310 As 3270-3280.

3310-3320 Sandstones and siltstone/Shales, interbedded - white sandstone, fine grained, well sorted, rounded clear grains; hard, siliceous; and green-gray sandstone - as above; and siltstone - as 3270-3280; shale - as 3270-3280; micaceous; pyrite masses; iron grains.

3320-3330 Shale - as 3270-3280.

3330-3340 As 3270-3280; calcareous; local mica.

3340-3350 As 3330-3340.

3350-3360 Sandstones and Siltstones/Shales, interbedded - as 3310-3320.

3360-3370 As 3310-3320; mostly white sandstone and siltstone - very sparse green-gray sandstone; no shale; not calcareous; 1% pyrite nodules; 3% iron grains.

3370-3380 As 3360-3370.

3380-3390 As 3310-3320; 70% white sandstone.

3390-3400 As 3310-3320.

3400-3410 As 3310-3320.

OWNER:

Columbia Gas Transmission Corp.

W# 20553

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3410-3420	As 3310-3320.
3420-3430	As 3310-3320.
3430-3440	As 3310-3320.
3440-3450	Shale - as 3270-3280.
3450-3460	As 3270-3280; sparsely calcareous.
3460-3470	As 3270-3280; sparse siltstone with fragments of calcite.
3470-3480	As 3270-3280.
3480-3490	As 3270-3280; calcareous.
3490-3520	No samples.
3520-3530	Shale/Limestone, argillaceous - as 3270-3280; calcareous; fossiliferous - coral, brachiopods; local mica; limestone is cryptograined; dark gray.
3530-3540	As 3490-3500.
3540-3550	Limestone, argillaceous/Shale, calcareous - as 3520-3530; increasing calcareousness.
3550-3580	As 3540-3550.
3560-3570	As 3540-3550.
3580-3610	As 3540-3550.
3610-3640	As 3520-3550; crystals of calcite.
3640-3670	As 3520-3550; pyrite.
3670-3700	Limestone - very light gray (N8) and medium light gray (N6); micrograined; very sparse crystals of calcite.
3700-3720	As 3670-3700.
3720-3750	As 3670-3700.
3750-3780	As 3670-3700; increasing white limestone.
3780-3810	As 3620-3700.
3810-3830	As 3670-3680; 70% white limestone; iron particles.
3830-3840	As 3810-3830.



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W# 20553

DEPTH  
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3840-3850 As 3810-3830; 90% white limestone.

3850-3860 As 3840-3850.

3860-3870 As 3840-3850; siltstone fragment - dark gray.

3870-3880 As 3860-3870.

3880-3890 As 3860-3870.

3890-3900 As 3860-3870.

3900-3910 As 3840-3850; very light olive gray (5Y 7/1).

3910-3920 As 3900-3910.

3920-3930 As 3900-3910.

3930-3940 As 3900-3910; light gray (N7).

3940-3950 As 3900-3910.

3950-3960 As 3900-3910.

3960-3970 As 3900-3910; light olive gray (5Y 6/1) and 1-3% white limestone.

3970-3980 As 3760-3770.

3980-3990 As 3760-3770; medium light gray (N6); carbonaceous siltstone - fragment.

3990-4000 As 3760-3770.

4000-4030 Limestone - light olive gray and 20% siltstone, "dirty" - dark brownish gray (5YR 5/1); carbonaceous; fine pieces; and fragment sandstone, greenish gray.

4030-4060 Shale - grayish red (10R 4/3); soft; some hard fragments; and limestone, as 4000-4030; and siltstone, as 4000-4030; fragments.

4060-4090 Siltstone - very light gray (N8), hard; and 20% medium dark gray (N4); and 3% shale fragment as 4030-4060, and limestone fragments with occasional calcite crystal fragments - as 4000-4030; mica; iron oxide grains.

4090-4120 As 4060-4090; 1% shale.

4120-4150 Limestone - light olive gray - as 4000-4030.

4150-4180 As 4120-4150; 5%± siltstone, dark gray (N3).

OWNER:

Columbia Gas Transmission Corp.

W# 20553

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4180-4210 Limestone - as 4120-4150, with 10% siltstone, sandy, dark gray; 5% siltstone, pale reddish brown (10R 5/4); 3% granule sized angular quartz/chert(?) fragments; 1% pyrite nodules; shale - reddish brown; soft.

4210-4240 As 4180-4210; lesser percentages siltstone/shale.

4240-4270 Siltstone - very light gray (N8) and medium gray (N5); fragments of coal/plant fossils in N5; some carboniferous and sandy, soft; and rare sandstone - very light gray (N8), very fine, moderately sorted, subrounded; hard.

4270-4300 As 4240-4270; 90% medium gray, local mica; iron grains.

4300-4330 As 4270-4300; few quartz grains.

4330-4360 As 4270-4300.

4360-4390 Shale, crushed - dark gray (N3); soft.

4390-4420 As 4360-4390.

4420-4450 As 4360-4390.

4450-4480 As 4360-4390.

4480-4510 As 4360-4390; (undetermined amount) siltstone - dark gray (N3); hard; pyrite; local or slight calcareousness.

4510-4520 As 4360-4390.

4520-4530 As 4360-4390.

4530-4540 As 4360-4390.

4540-4550 Shale (fresh) - as 4360-4390; (dark gray).

4550-4560 Shale, crushed - as 4360-4390 (olive gray).

4560-4570 As 4550-4560.

4570-4580 As 4550-4560.

4580-4590 As 4550-4560.

4590-4630 As 4550-4560.

4630-4640 (fresh) - as 4550-4560 (dark gray); ?% shale, sandy - dark gray; coarse quartz grains and 3-5% shale - dark reddish brown (10R 3/4); and 1%(?) light gray (N7) siltstone.

OWNER:

Columbia Gas Transmission Corp.

W# 20553

DEPTH  
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4640-4650 (fresh) - as 4360-4390.

4650-4660 As 4360-4390.

4660-4670 As 4360-4390.

4670-4680 As 4360-4390.

4680-4690 As 4360-4390.

4690-4700 Siltstone (60%)/Shale (40%) - interbedded; shale - as 4360-4390; and siltstone - light olive gray (5Y 6/1); crushed - looks like sand.

4700-4710 As 4690-4700; 50% each.

4710-4720 Shale, weathered - as 4690-4700; (60%) dark siltstone/shale; siltstone is dark gray, fine grained and hard; olive gray siltstone has been crushed; local pyrite; iron oxide grains.

4720-4730 No sample.

4730-4740 As 4690-4700; 90% dark gray siltstone/shale; but siltstone grading into shale; iron oxide.

4740-4750 As 4730-4740.

4750-4760 Siltstone - dark gray (N3) and medium gray (N5); hard; with 1-3% shale; "black" iron staining on fragments.

4760-4770 Siltstone - medium gray; soft to hard; fresh; and shale, black (N1), soft; fissile.

J. K. Polzin.  
May 22 - June 5