



00653369

## GEOLOGICAL REPORT

CHANDLER-MUSGROVE, INC.

COLORADO STATE B-1

SW SW Sec. 15 - T19S-R47W

KIOWA COUNTY, COLORADO

Elevation: 4100 KB - 4089 Gr.

The above well was spudded May 29, 1957 and set one joint (30 feet) of 13-5/8 inch conductor pipe. Twelve inch hole was then drilled ahead in anticipation of encountering salt section beneath the Blaine. Salt was encountered at 1854 and hole was drilled ahead to 2165 where circulating samples indicated that hole was below the salt. An intermediate casing string of 8-5/8 inch pipe was cemented at 2165 feet with 525 sacks of regular cement. A temperature survey indicated cement to 650 feet but also indicated channeling. The well went out from beneath intermediate string June 6, 1957.

The following formation tops corrected to Schlumber Log were picked on the well:

<u>Formation</u>	<u>Top</u>
<u>Cretaceous</u>	
Fort Hays Limestone	282
Codell Sandstone	336
Dakota Sandstone	799
<u>Jurassic</u>	
Morrison	1158
Curtis	1404
<u>Permian</u>	1488
Day Creek	1590
Blaine	1809
Stone Corral	2267
Chase Group	2434
Admire Group	3002
<u>Pennsylvanian</u>	3348
Shawnee Group	3496
Lansing Kansas City Group	3799
Base Kansas City	4152
Marmaton Group	4179
Cherokee	4330
Atoka	4535
Morrow	4722
Keyes Limey Zone	4949
<u>Mississippian</u>	4974 (St. Genevieve)
St. Louis	5038
Total Depth	5080

The well was set up as a thorough test of all formations into the Mississippian. The upper part of the hole was not watched, but examination of the samples showed spotted dead oil stain in the samples from 850 to 920.

The salt section below the Blaine was well developed but not as thick as in the Colorado A-1.

The Chase Group was very poorly developed and consisted of only a few very thin dense dolomite stringers.

There were no shows encountered in any of the limestones in the Admire Group or in any of the upper Pennsylvanian beds. There were no good porous breaks encountered in the Shawnee Group though several oolitic and oolitic beds were observed.

There were several oolitic and oolitic zones in the Lansing-Kansas City and several had good drilling breaks but there were no shows of any kind; even the dolomite zone in the lower part of the Kansas City was tight and had no fluorescence, stain or cut.

There was a slight show of oil encountered in a thin dolomite at the very top of the Marmaton. The stain was very spotted, dark and dead looking. There was a pale yellow fluorescence but no kick on the gas meter. Because the zone was at most 5 feet thick it was decided not to test unless log indicated it to be worthwhile. The logs indicated the zone was only about 3 feet thick and had no porosity.

Another show was encountered in very fossiliferous limestone at 4330. There was a kick of 26 units of methane on the gas meter and samples had fluorescence and slight cut but no visible stain in circulating samples at 4330. It was decided to drill ahead to 4350 as the show occurred at night and to test the zone from 4324 to 4350. This was done with bottom of packer set at 4324 and total depth of 4350. The tool was open 30 minutes. There was no blow of any kind and it was thought that tool might be plugged, so test was shut in after 30 minutes and pulled. Charts showed that a test had been secured. Recovery was 5 feet of rotary mud. Pressures were all zero and hydrostatic pressure was 2090# initial, 2080# final.

This zone was calculated out after logs were run and zone from 4324-27 had only 8% porosity.

There were no further shows encountered in the test. The only sand encountered in the Morrow was at 4848-50, it was very tight, very coarse, quartz wash sand with slight limey cement. Its position indicated that it is probably equivalent to the McClave zone.

The well was drilled to 5080 total depth and ES-induction, Gamma-Ray Neutron and Micro logs were run. Careful evaluation indicated nothing had been passed up and all contributing parties gave permission to plug and abandon.

The well was plugged in the following manner: A Halliburton plug was driven to 1800 feet and a 45 sack cement plug was spotted on top of it by pump truck. The upper portion of the 8-5/8 inch intermediate string was pulled and a 5 sack cement plug spotted in the top of the conductor pipe with a steel cap welded on top of it.

Plugging was completed June 26, 1957.

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DETAILED SAMPLE DESCRIPTION

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KIOWA COUNTY, COLORADO

Elevation: 4100 KB

Samples start at 40 feet in Niobrara.

- 40 - 100 Shale, gray, dark gray, gray-black, little black micaceous, calcareous specked
- 100 - 200 Shale, light gray, gray, little dark gray, micaceous, calcareous specked, little quite calcareous specked 130-40 and 190-200; trace inoceramus prisms 180-90
- 200 - 282 Shale, dark gray, gray-black, gray, calcareous specked; traces inoceramus prisms; some quite to very calcareous specked; some gray and white chalky shale 250-80
- 282 - 336 Limestone, white, buff, gray, very finely crystalline, dense, chalky; Globigerina and inoceramus prisms
- 336 - 339 Shale, dark gray calcareous specked
- 339 - 348 Sandstone, gray, gray-white, fine, angular, micaceous tight, limey  
(note: Samples are contaminated badly from 350 to 450 It is felt that this 100 feet was sacked from 1 sample)
- 348 - 400 Shale, gray and dark gray, calcareous specked, micaceous
- 400 - 500 Shale, gray, dark gray, gray-black, micaceous; some calcareous specked, some limey; shark tooth 430-40; inoceramus prisms, fish bones 480-90; little sandy streaks 440-50 and 470-80; little limestone, brown, crystalline, dense, fossil fragment, argillaceous 490-500
- 500 - 550 Shale, gray, gray-black, dark gray, calcareous specked, traces of pyrite; some stringers or thin lentils of limestone brown, brown-buff, crystalline to finely crystalline, granular, dense, fossil fragment 520-40; traces pyrite and bentonite
- 550 - 600 Shale, as above; interbedded or interlaminated limestone, gray, dark gray, gray-brown, brown, very finely crystalline, dense fossil fragment, argillaceous, some granular, very finely sandy; trace pyrite

- 600 - 633 Shale, as above, with few limestone lentils as above trace fish scales  
(Note: The Greenhorn zone is apparently from 520-633 but it is poorly developed in the samples and there is little or no evidence of it on the Gamma-Ray-Neutron Log)
- 633 - 685 Shale, gray, dark gray to black, hard, calcareous specked to very calcareous specked; micaceous
- 685 - 752 Shale, gray, dark gray, micaceous, some calcareous specked to slightly limey, hard; interlaminated gray and dark gray, very fine, angular, micaceous tight limey sandstone; traces of bentonite
- 752 - 799 Shale, black to dark gray, micaceous, non-limey; traces bentonite, fish scales and fragments; trace sandy lentils at base
- 799 - 845 Sandstone, gray, gray-white, fine, angular, micaceous tight to friable, slightly glauconitic; little carbonaceous streaks; some very fine, silty lenses
- 845 - 849 Shale, black, gray-black, dark gray, micaceous
- 849 - 900 Sandstone, gray, dark gray, fine, angular, micaceous friable, slightly glauconitic; little carbonaceous and shaley streaks; some spotted black-brown dead oil stain; good dead oil stain and some saturation 890-900 some lenses of medium grain
- 900 - 920 Sandstone, gray, dark gray, fine to medium, angular, micaceous, tight to friable; some dirty argillaceous and silty streaks; slightly glauconitic; traces of pyrite and siderite; trace spotted dead oil stain
- 920 975 Sandstone, gray, dark gray, very fine to medium angular, micaceous, tight to friable, slightly glauconitic; considerable silty and shaley carbonaceous streaks interbedded black carbonaceous shale 940-50; siderite and pyrite
- 975 - 979 Shale, black, micaceous, some carbonaceous
- 979 - 1000 Sandstone, gray and dark gray, very fine to fine, angular, micaceous, tight to friable; little to abundant siderite; traces pyrite; very dirty in part; some carbonaceous streaks
- 1000 - 1078 Sandstone, gray, dark gray, very fine to fine angular, micaceous; considerable argillaceous, with numerous shaley and carbonaceous streaks; probably some interbedded shale; slightly glauconitic; pyrite and siderite; much intergranular clay

- 1078 - 1097 Sandstone, dark gray, gray, fine angular, micaceous tight; very dirty in part; little medium to coarse grained; traces pyrite, siderite
- 1097 - 1102 Shale, black, micaceous
- 1102 - 1158 Sandstone, gray, light gray, fine to very coarse angular, micaceous, tight to mostly loose grains, considerable to abundant very coarse, vari-colored quartz and chert conglomeratic grains; traces pyrite and siderite
- 1158 - 1188 Shale, pale green, maroon, talcy, clay
- 1188 - 1210 Sandstone, gray to white, fine to coarse, angular to subrounded, tight; some very coarse conglomeratic quartz and chert grains; some limey; some interlaminated maroon and green, talcy, clay
- 1210 - 1218 Shale, maroon, green, trace purple, clay
- 1218 - 1255 Sandstone, gray, white, buff, fine to very coarse angular to subangular, tight, limey, with abundant pink and red grains; considerable very coarse conglomeratic quartz and chert grains; abundant pyrite; some thin clay shale, lentels
- 1255 - 1258 Shale, dark purple clay
- 1258 - 1262 Limestone, buff, tan, gray, trace pink very finely crystalline to finely crystalline, very dense
- 1262 - 1268 Sandstone, buff, fine to medium, angular to subangular, tight, limey, much intergranular cement; some vari-colored grains
- 1268 - 1297 Shale, maroon, purple, green, talcy, clay; with interbedded lenses of sandstone as above and limestone, buff, tan, brown, gray, very finely crystalline, dense 1270-80; some shale is sandy
- 1297 - 1304 Sandstone, white to buff, fine to medium, angular to subangular, tight, limey
- 1304 - 1350 Shale, maroon, purple-red, green, gray-green, talcy, clay; some sandy; some sandstone and dense marly limestone lenses
- 1350 - 1404 Shale, green, gray-green, purple-red, maroon, talcy and marly; some sandy; some interbedded limestone, gray-tan, very finely crystalline, dense, marly, considerable sandy 1355-60; traces of red, gray, tan opaque and semi-opaque quartzose chert; little interbedded sandstone, gray to white, fine to coarse, angular to subangular, tight, limey 1380-1400

- 1404 - 1420 Shale, green, gray, purple-red, maroon, talcy and marly some sandy; little interbedded sandstone, buff to gray fine to coarse, angular to subangular, tight, limey, trace brown very fine to fine, tight, sandstone; little white granular anhydrite
- 1420 - 1447 Shale, gray-green, maroon, green, hard, clay; little sandy traces of white flaky gypsum; little interlaminated sandstone
- 1447 - 1465 Shale, green, maroon, gray-green, clay, slightly sandy; some gray to yellow-tan dense marl; traces of white gypsum, trace pink-red quartzose chert
- 1465 - 1471 Sandstone, buff to gray, fine to coarse, angular to subangular, slightly limey; much intergranular clay; trace white flaky gypsum
- 1471 - 1488 Shale, maroon, purple, green, dark red clay, little white gypsum, trace anhydrite; traces of gypsiferous sandstone
- 1488 - 1505 Shale, red, brown-red, dark red, micaceous; little white flaky gypsum
- 1505 - 1552 Shale, as above, trace green; some white flakey gypsum trace granular anhydrite
- 1552 - 1590 Shale, as above and dark orange-red, orange-red micaceous, silty and siltstone, traces of anhydrite and gypsum
- 1590 - 1596 Dolomite, buff, tan, pink, red, white, very finely crystalline, dense, slightly anhydritic and little anhydrite
- 1596 - 1605 Shale, orange, orange-red, micaceous, some silty; little purple-red
- 1605 - 1613 Dolomite, buff, pink, red, very finely crystalline, dense, anhydritic; little anhydrite
- 1613 - 1700 Shale, orange, dark orange, orange-red, micaceous, little silty; traces of siltstone; traces of gypsum
- 1700 - 1756 Shale, orange, orange-red, micaceous, some silty and siltstone
- 1756 - 1761 Anhydrite, white, buff, pink, tan, dense, massive, little white gypsum, trace dolomite
- 1761 - 1810 Shale, orange-red, dark red, little green, micaceous; traces of anhydrite and gypsum

- 1810 - 1818 Anhydrite, white, buff, pink, tan, finely granular to massive, dense; some white flakey gypsum; trace dolomite
- 1818 - 1823 Shale, orange to dark red, gyp
- 1823 - 1828 Anhydrite and gypsum as above
- 1828 - 1832 Shale as above
- 1832 - 1854 Anhydrite, white to buff, crystalline, granular to massive, dense and white crystalline to flakey gypsum
- 1854 - 1860 Shale, dark red
- 1860 - 1880 Anhydrite, gypsum, and dark red shale; trace saltcastic (Note: This section is probably impure salt)
- 1880 - 1890 Shale, red and dark red
- 1890 - 1952 Anhydrite, white, finely crystalline, granular to massive dense and white flakey gypsum; traces of salt-castic anhydrite (Note: This section is probably impure salt)
- 1952 - 2000 Shale, red, dark red, orange-red, traces green, micaceous traces of anhydrite and gypsum; little orange-red very, very fine gypsiferous sandstone apparently as thin laminae
- 2000 - 2079 Shale, orange-red to dark red, micaceous, some silty to siltstone
- 2079 - 2098 Anhydrite, white, pink, red, finely crystalline, granular to massive, some white gypsum; dense
- 2098 - 2127 Shale, orange, orange-red, micaceous
- 2127 - 2154 Sandstone, orange, orange-red, very fine to slightly medium, angular, friable, very gypsiferous
- 2154 - 2159 Shale, as above
- 2159 - 2165 Sandstone, orange to dark orange-red, very fine to slightly medium, angular to subangular, tight to friable slightly gyp
- Set 8-5/8 inch intermediate string at 2165  
No samples 2160 - 2190
- 2190 - 2267 Sandstone, orange to dark orange-red, fine to coarse angular to subangular, some subrounded most loose grains; much white flakey gypsum at base

- 2267 - 2309 Anhydrite, white, buff, pink, finely crystalline to massive, dense; little white gypsum
- 2309 - 2322 Shale, orange, orange-red, micaceous, silty and siltstone
- 2322 - 2338 Sandstone, orange to dark orange-red, very very fine angular, micaceous, silty, friable
- 2338 - 2388 Siltstone, orange to dark orange-red, micaceous; some silty shale
- 2388 - 2405 Shale, orange, orange-red, micaceous, silty and siltstone
- 2405 - 2424 Sandstone, orange to dark orange-red, very very fine to very fine, angular, micaceous, silty
- 2424 - 2434 Shale, dark red, micaceous, firm
- 2434 - 2439 Dolomite, red, orange-red, pink-red, very finely crystalline, dense, considerable silty
- 2439 - 2447 Shale, as above
- 2447 - 2481 Sandstone, dark orange-red, very fine, angular, micaceous, tight to friable, silty; grading to siltstone at base; trace interbedded dolomite, red, pink-red, very finely crystalline, dense, silty
- 2481 - 2485 Shale, dark red, micaceous
- 2485 - 2501 Siltstone, orange-red to dark red, micaceous, some interbedded dark red micaceous shale
- 2501 - 2511 Shale, dark red, purple-red, micaceous, considerable silty
- 2511 - 2537 Sandstone, various shades of red, little buff, very, very fine angular, micaceous, tight silty
- 2537 - 2542 Shale, dark red to purple-red, micaceous, silty
- 2542 - 2556 Siltstone, orange, orange-red, little gray-buff, micaceous some interbedded silty shale and trace of red-purple, very finely crystalline, dense dolomite
- 2556 - 2561 Shale, as above
- 2561 - 2566 Dolomite, red, purple, very finely crystalline, dense

- 2566 - 2594 Shale, dark red, dark orange-red, purple, chocolate, silty micaceous interbedded with orange-red siltstone some orange and gray-green
- 2594 - 2601 Sandstone, orange, orange-red, gray-green, micaceous, very, very fine to very fine, tight, silty
- 2601 - 2650 Siltstone, orange, orange-red, micaceous; some interbedded dark red shale; trace green-gray siltstone
- 2650 - 2663 Shale, dark red, purple-red, orange-red micaceous
- 2663 - 2682 Sandstone, orange-red, orange, light gray, very very fine angular, micaceous, silty to siltstone
- 2682 - 2689 Dolomite, red, crystalline, dense, slightly limey
- 2689 - 2704 Siltstone or very, very fine sandstone as above
- 2704 - 2708 Shale, dark red, micaceous, non-silty
- 2708 - 2758 Siltstone and silty shale, orange, orange-red, purple-red micaceous; trace gyp
- 2758 - 2766 Shale, dark red, orange-red, purple, chocolate, micaceous little silty
- 2766 - 2780 Siltstone or very, very fine silty sandstone, orange to dark orange-red, micaceous
- 2780 - 2786 Shale, dark red, purple-red, micaceous
- 2786 - 2851 Siltstone and silty shale, orange to brown, little purple and gray, micaceous; trace dark red dense limestone 2840-50
- 2851 - 2876 Shale, brown-red, dark red, orange-red, micaceous; little purple with interbedded siltstone as above, traces of dark red dense limestone
- 2876 - 2882 Shale, as above, considerable chocolate and purple
- 2882 - 2941 Siltstone and silty shale, brown-red to orange-red, chocolate, micaceous; some interbedded non-silty shale
- 2941 - 2998 Sandstone, orange-red, gray, green-gray, very very fine angular, micaceous, slightly limey; some shaley streaks
- 2998 - 3002 Shale, dark red, brown, brown-red, micaceous, some silty
- 3002 - 3022 Limestone, gray, buff, gray-buff, brown, tan, purple-gray finely crystalline, dense; little slightly crystalline; slightly argillaceous; considerable silty

- 3022 - 3042 Shale, dark red, orange-red, micaceous
- 3042 - 3058 Sandstone, pale orange-red, pale purple-red, trace gray, green, very very fine, angular, micaceous, silty; trace gypsum and red dense dolomite
- 3058 - 3061 Shale, red, brick-red, brown, micaceous, some silty
- 3061 - 3081 Siltstone and silty shale, dark red, purple, chocolate, brown-red, brown, micaceous, argillaceous
- 3081 - 3090 Sandstone, vari-colored, very very fine to very fine, angular, micaceous, tight, limey, silty; some interbedded silty shale at base
- 3090 - 3106 Limestone, vari-colored, finely crystalline to slightly crystalline, dense; little slightly oolitic; trace fossiliferous; interbedded sandstone, purple-red, fine, angular, micaceous, tight, 3098-3102
- 3106 - 3120 Shale, brick-red to purple-red, micaceous, some silty; trace siltstone
- 3120 - 3148 Siltstone, brown, chocolate, purple, micaceous, argillaceous, some interbedded silty shale, becomes very very fine sandstone at base
- 3148 - 3162 Shale, dark red, purple-red, brick-red, chocolate, micaceous, considerable silty, little siltstone
- 3162 - 3168 Limestone, red, red-brown, gray, gray-green, finely crystalline to crystalline, dense; considerable very finely sandy; grading to gray and greenish-gray, very fine, very limey sandstone at base
- 3168 - 3197 Shale, chocolate, purple, brick, brown-red, micaceous, considerable silty, with interbedded siltstone and gray, green-gray, very fine, angular, micaceous, tight, limey, silty sandstone
- 3197 - 3208 Sandstone, purple-red, green-gray, fine, angular, micaceous, friable, limey
- 3208 - 3232 Shale, red to chocolate, micaceous; becomes very silty with some siltstone 3213-30
- 3232 - 3236 Limestone, gray, gray-buff, buff, tan, gray, very finely crystalline to slightly crystalline, dense; very very finely sandy to silty at base, slightly fossiliferous
- 3236 - 3250 Shale, brick-red, chocolate, dark red, trace green, micaceous

- 3250 - 3258 Limestone, gray, gray-buff, buff, very finely crystalline to finely crystalline dense; some very finely sandy; grading to gray-buff and gray, very fine, angular, micaceous, very tight, limey sandstone at base
- 3258 - 3262 Shale, brick-red, dark red, chocolate, green, micaceous
- 3262 - 3268 Limestone, gray, gray-buff, buff, very finely crystalline to finely crystalline, dense, very finely sandy
- 3268 - 3270 Shale, brick-red to chocolate, micaceous, trace crystalline gypsum
- 3270 - 3291 Shale, as above with interbedded stringers or lentils of gray to buff, finely crystalline to slightly crystalline, dense, finely sandy limestone.
- 3291 - 3296 Shale, as above
- 3296 - 3302 Shale, as above, with interbedded limestone stringers
- 3302 - 3308 Sandstone, gray, gray-white, pale pinkish-red, very fine to fine, angular micaceous, very limey
- 3308 - 3313 Shale, brick-red, chocolate, dark red, green, little purple, micaceous
- 3313 - 3319 Limestone, gray, gray-buff, slightly green-gray, finely crystalline to slightly crystalline, dense
- 3313 - 3348 Shale, brick-red, chocolate, brown, dark red, micaceous, with interbedded lenses or lentils of sandstone and dense limestone nodules
- 3348 - 3366 Limestone, gray, tan, brown, red, tan-buff, very finely crystalline to slightly crystalline, dense; considerable mottled; some dense oolitic; becomes silty and argillaceous toward base
- 3366-- 3369 Shale, dark red, very micaceous, hard
- 3369 - 3376 Sandstone, light gray-red, gray-buff, buff, very fine to fine, angular, micaceous, very limey
- 3376 - 3389 Siltstone, with considerable silty shale, chocolate-brown, brown-red, brown, micaceous, hard, slightly limey
- 3389 - 3407 Shale, as above with considerable interbedded sandstone, red, brown-red, little gray, very fine, angular, micaceous, tight, slightly limey, argillaceous, in thin lenses

- 3407 - 3410 Limestone, gray-buff, buff, gray, finely crystalline to slightly crystalline, dense, finely sandy, micaceous; trace fossils; some red-gray mottled
- 3410 - 3413 Shale, dark purple-red, brown, green, micaceous
- 3413 - 3426 Limestone, gray, buff, tan, brown, trace red, finely crystalline to crystalline, dense, slightly micro-fossiliferous; becomes finely sandy and argillaceous; abundant large Fusulines
- 3426 - 3429 Shale, dark red, chocolate, purple-red, green
- 3429 - 3446 Sandstone, dark gray, gray, greenish-gray, brown, very fine, angular, micaceous, very silty, limey, argillaceous; with interbedded shale, as above; sandstone is in part almost argillaceous siltstone
- 3446 - 3453 Limestone, brown, tan, gray, yellow-gray, red-gray, mottled, finely crystalline to crystalline, slightly nodular, dense, highly micro-fossiliferous and fossil fragmental
- 3453 - 3460 Shale, red, purple-red, dark red, trace green, slightly micaceous, slightly limey
- 3460 - 3470 Limestone, gray, red-gray, buff, trace red, finely crystalline to slightly crystalline, dense; some fossil fragments
- 3470 - 3472 Shale, chocolate, brown, little red, slightly micaceous
- 3472 - 3487 Sandstone, gray, greenish-gray, red-gray, very fine, angular, very micaceous, silty, limey, some argillaceous
- 3487 - 3496 Shale, vari-colored, micaceous; little sandy; trace dense limestone nodules (red)
- 3496 - 3538 Limestone, gray to buff, gray-buff, tan, brown, finely crystalline to slightly crystalline; slightly dense oolitic to coarsely oolitic; some finely granular oolitic at top; slightly dolomitic; some very micro-fossiliferous
- 3538 - 3540 Shale, dark red, gray-black, trace black, micaceous
- 3540 - 3566 Limestone, gray, buff, tan, brown, gray-buff, some mottled, very finely crystalline to crystalline, dense; some fossiliferous and micro-fossiliferous (Fusuline Brachiopod spines) interbedded sandstone, gray and dark gray, very fine, angular micaceous, tight, limey 3554-58; some gray- very finely crystalline, dense slightly earthy dense, limey dolomite at base; trace gray opaque

- 3566 - 3572 Shale, vari-colored, micaceous; trace black
- 3572 - 3598 Limestone, brown, tan, gray, buff, finely crystalline to slightly coarsely crystalline; slightly fossiliferous, micro-fossiliferous, some dolomitic; traces, tan, brown gray-tan, opaque chert, little interbedded or inter-laminated sandstone, gray, very fine, tight, limey; little very oolitic 3580-85
- 3598 - 3601 Shale, dark-red, red, black, micaceous
- 3601 - 3606 Limestone, gray, little buff, tan, brown, finely crystalline, dense
- 3606 - 3616 Siltstone, gray, brown, red-brown, greenish-gray, very micaceous, limey, argillaceous
- 3616 - 3618 Shale, chocolate-red, micaceous
- 3618 - 3643 Limestone, buff, tan, gray, gray-brown, finely crystalline to slightly crystalline, dense; some micro-fossiliferous; little white, chalky
- 3643 - 3646 Shale, dark red, green, black, micaceous
- 3646 - 3693 Limestone, gray, brown, gray-buff, buff, very finely crystalline to crystalline, dense; micro-fossiliferous and fossil fragmental; some white to buff and white chalky; little fossil vug porosity 3653-57 and 3666-83; slightly dolomitic in spots
- 3693 - 3695 Shale, black, micaceous, fissile
- 3695 - 3712 Sandstone, gray, dark gray, greenish-gray, brown, very fine, angular, micaceous, tight, limey, silty
- 3712 - 3718 Siltstone, greenish-gray, gray, micaceous, limey, very shaley
- 3718 - 3748 Limestone, buff, tan, white, very finely crystalline to crystalline, dense, considerable chalky; some fossil fragmental and slightly algal; some fossiliferous porosity 3718-25; no show
- 3748 - 3755 Shale, vari-colored, hard, micaceous, limey, silty and siltstone
- 3755 - 3778 Limestone, buff to white, finely crystalline to crystalline, dense; medium to coarsely oolitic; brachiopods; some white chalky

- 3778 - 3785 Sandstone, light gray, very fine, angular, micaceous, limey, silty
- 3785 - 3796 Siltstone and silty shale, green-gray, gray, brown, brown-red, micaceous, limey
- 3796 - 3799 Shale, dark green, gray-green, dark red, brown-red, gray, micaceous, limey; some silty
- 3799 - 3808 Limestone, buff, tan, brown, finely crystalline to crystalline, dense, oolitic and micro-fossiliferous (pseudo-oolitic); Fusulinid sections
- 3808 - 3820 Shale, dark red, dark gray, micaceous, hard, slightly limey
- 3820 - 3828 Sandstone, green, greenish-gray, gray, very fine, angular, micaceous, silty, limey
- 3828 - 3832 Siltstone, and silty shale, green, green,-gray, micaceous, limey
- 3822 - 3838 Limestone, tan, brown, buff, finely crystalline to slightly crystalline, dense; slightly fossil fragmental
- 3838 - 3848 Shale, dark red, chocolate, brown, micaceous, hard, becoming black, carbonaceous, micaceous and fissile at base
- 3848 - 3857 Limestone, dark gray, mottled, buff, tan, brown, finely crystalline to crystalline, dense; some fossil fragmental; Fusulinids; becomes very micro-fossiliferous and slightly oolitic at base
- 3857 - 3864 Shale, green, gray-green, micaceous, limey, silty and siltstone
- 3864 - 3880 Limestone, buff-brown, tan, brown, gray, finely crystalline to slightly crystalline, dense, oolitic and highly micro-fossiliferous
- 3880 - 3893 Limestone, buff to white, finely crystalline to crystalline, oolitic and oolitic; no show; no connected porosity visible. Shows separation on Micro-log
- 3893 - 3916 Limestone, buff, tan, brown, gray, finely crystalline to crystalline, dense, some oolitic, and oolitic; becomes more coarsely crystalline and very coarsely oolitic and pseudo-oolitic (micro-fossiliferous) at base
- 3916 - 3930 Siltstone, green, gray-green, micaceous, limey with interlaminated, silty shale; trace dense limestone nodules

- 3930 - 3946 Limestone, brown, buff-brown, finely crystalline to slightly crystalline, dense, highly oolitic and pseudo-oolitic (micro-fossiliferous) interbedded black, hard, micaceous, slightly carbonaceous shale 3942-44
- 3946 - 3950 Siltstone, green, gray-green, micaceous, argillaceous, limey
- 3950 - 3964 Sandstone, gray, green-gray, little green, very very fine to very fine, angular, micaceous, tight, limey, silty; some argillaceous
- 3964 - 3968 Shale, dark gray, dark green, gray-black, trace black micaceous, slightly limey, silty
- 3968 - 4008 Limestone, brown, buff, buff-brown, tan, brown, finely crystalline to slightly crystalline, dense; very fossiliferous and micro-fossiliferous; traces dense oolitic; Fusuline fragment and other coarse fossil fragments
- 4008 - 4028 Sandstone, gray, green-gray, very fine, angular, micaceous, limey and silty; slightly argillaceous; grading to siltstone and silty shale
- 4028 - 4072 Limestone, buff, gray, tan, brown, gray-brown, finely crystalline to slightly coarsely crystalline, dense oolitic and very pseudo-oolitic (micro-fossiliferous) some very oolitic and fossil vug porosity 4030-35, 4038-44, 4045-59 and 4061-65; No shows; some slightly sugary dolomitic toward base
- 4072 - 4075 Shale, black, gray-black, dark gray, micaceous, some carbonaceous
- 4075 - 4099 Limestone, gray, gray-buff, brown, tan, tan-buff, finely crystalline to crystalline, very dense; some very chalky; much micro-fossiliferous traces, tan-gray, gray-tan opaque and semi-opaque chert; slightly oolitic at base
- 4099 - 4115 Dolomite, buff to brown, very finely sacchoroidal, dense, very limey (probably more nearly dolomitic limestone)
- 4115 - 4129 Limestone, buff, tan, gray, dark brown, very finely crystalline to crystalline, dense, slightly dolomitic, abundantly fossiliferous; trace spotted oil stain; gives slight cut in carbon tetrachloride but has no fluorescence wet or dry
- 4129 - 4133 Dolomite, brown, brown-gray, very finely crystalline, dense, slightly limey

- 4133 - 4152 Limestone, tan to light brown, finely crystalline to crystalline, coarsely oolitic and slightly oolitic, no permeability, no show 4134-42; becomes more gray to brown, mottled, finely oolitic and dense 4142-52; trace white opaque oolitic chert
- 4152 - 4160 Sandstone, gray, gray-white, very fine to fine angular, very micaceous, tight, limey
- 4160 - 4179 Siltstone and silty shale, green, gray-green, gray, micaceous, slightly limey, pyritic
- 4179 - 4185 Dolomite, brown to gray, finely crystalline to crystalline, considerable granular, very fossiliferous; spotted dead brown, dark oil stain; dull yellow fluorescence, slight cut; micro-log separate 4182-85
- 4185 - 4193 Limestone, brown, mottled to buff, finely crystalline to very crystalline, dense; some abundantly micro-fossiliferous; traces pyrite
- 4193 - 4200 Shale, green, gray-green, dark gray, gray, micaceous, some silty with interbedded siltstone
- 4200 - 4208 Limestone, buff, buff-gray, buff-brown, mottled, finely crystalline to crystalline, dense; abundantly fossiliferous and micro-fossiliferous
- 4208 - 4210 Shale, black, gray-black, trace brown, micaceous, fissile
- 4210 - 4223 Limestone, buff, tan, brown, gray, gray-brown, very finely crystalline to slightly crystalline, dense
- 4223 - 4225 Shale, black, gray-green, brown, hard, micaceous, limey, some silty to very finely sandy
- 4225 - 4228 Sandstone, gray, greenish-gray, very fine, angular micaceous, silty, limey
- 4228 - 4238 Siltstone and silty shale, gray and greenish-gray, green micaceous with black fissile shale at base
- 4238 - 4260 Limestone, brown to buff, little gray, tan, gray-buff, finely crystalline to slightly crystalline, dense; some fossiliferous; little brown; tan, brown-black, black opaque slightly glassy chert
- 4260 - 4264 Shale, black, micaceous, some fissile, some carbonaceous
- 4264 - 4268 Siltstone, greenish-gray, gray, micaceous, limey, some shaley

- 4268 - 4315 Limestone, brown to buff, very finely crystalline to crystalline, dense; some micro-fossiliferous; becomes more gray, dark gray, gray-brown toward base and slightly silty and argillaceous
- 4315 - 4320 Shale, black, micaceous, fillile; considerable lignitic
- 4320 - 4324 Dolomite, brown to gray, very finely crystalline, sugary, dense very limey
- 4324 - 4330 Limestone, brown, buff, buff-brown, tan, very finely crystalline to crystalline, dense, some sugary, dolomitic; very micro-fossiliferous and fossiliferous; Had 26 units of methane on Baroid gas analyser; wet samples had fluorescence and slight cut
- 4330 - 4340 Shale, black, micaceous, fissile, some carbonaceous
- 4340 - 4345 Limestone, brown, gray, buff, very finely crystalline, dense
- 4345 - 4350 Shale, as above and dark gray, gray; some limey; trace silty
- 4350 - 4353 Limestone, brown, black-brown, tan, finely crystalline to crystalline, dense
- 4353 - 4358 Shale, black micaceous
- 4358 - 4370 Siltstone, and silty shale, gray, green-gray, micaceous, limey
- 4370 - 4373 Shale, black, hard, micaceous
- 4373 - 4380 Limestone, brown-black, gray-black, dark gray, very finely crystalline, dense, very argillaceous
- 4380 - 4383 Shale, black, micaceous, fissile, carbonaceous
- 4383 - 4385 Siltstone, gray, green-gray, micaceous
- 4385 - 4392 Limestone, gray, tan, buff, finely crystalline to slightly crystalline, dense, some fossil fragments
- 4392 - 4405 Shale, black micaceous and green-gray, green, gray micaceous, silty, limey
- 4405 - 4410 Limestone, buff to brown, very finely crystalline to crystalline, dense, becoming mostly brown at base; brachiopod fragments
- 4410 - 4415 Shale, gray, black, dark gray, green-gray, micaceous, limey, little silty; some siltstone

- 4415 - 4420 Limestone, buff to brown, gray, very finely crystalline to crystalline, dense
- 4420 - 4424 Shale, black, micaceous, very carbonaceous; some gray-black, dark gray, micaceous, silty
- 4424 - 4431 Limestone, brown, tan, trace gray and buff, finely crystalline to slightly crystalline dense; slightly fossiliferous (brachiopod spines)
- 4431 - 4434 Shale, black, micaceous, carbonaceous; trace gray-green
- 4434 - 4440 Limestone, gray to brown, tan, very finely crystalline to finely crystalline, dense
- 4440 - 4443 Shale, black, gray-black, micaceous, fissile, some limey pyrite
- 4443 - 4448 Limestone, gray to dark brown, black, very finely crystalline to finely crystalline, dense; some argillaceous
- 4448 - 4451 Shale, black, micaceous
- 4451 - 4460 Dolomite, gray, tan, very finely crystalline, dense, siliceous, argillaceous; much coarse secondary crystals; circulation samples at 4456 had fluorescence, 7 units of gas but no odor, stain or cut; grading to limestone at base
- 4460 - 4472 Shale, black, gray-black, dark gray, micaceous with interbedded limestone, gray to black, brown, very finely crystalline, dense, very argillaceous
- 4472 - 4484 Limestone, gray, dark gray, gray-brown, brown, very finely crystalline to slightly crystalline, dense; some argillaceous; considerable fossil fragments
- 4484 - 4490 Shale, black, little gray-black, dark gray, micaceous, trace pyrite
- 4490 - 4496 Limestone, gray, brown, dark gray, gray-black, very finely crystalline to slightly crystalline, dense, some argillaceous slightly fossiliferous
- 4496 - 4498 Shale, black to dark gray, micaceous, hard; some limey
- 4498 - 4535 Limestone, brown, gray, black-brown, dark brown, very finely crystalline to finely crystalline, dense, some argillaceous, trace black opaque chert; with interbedded shale, black, micaceous, carbonaceous

- 4535 - 4552 Limestone, dark brown, brown, brown-black, tan, gray very finely crystalline to slightly crystalline, very dense, siliceous, argillaceous; much white and buff sugary anhydrite which appears to be in place
- 4552 - 4562 Shale, black, fissile, micaceous
- 4562 - 4575 Limestone, dark gray, gray-black, black, little gray, very finely crystalline, dense, very argillaceous, siliceous; some fossil fragments
- 4575 - 4578 Shale, as above
- 4578 - 4590 Limestone, gray, gray-black, dark brown, very finely crystalline, dense, argillaceous; some fossils (brachiopod spines and Fusulinid sections)
- 4590 - 4593 Shale, black, gray-black, micaceous, slightly limey
- 4593 - 4609 Limestone, dark gray, gray-black, brown, little gray very finely crystalline to slightly crystalline, dense, slightly fossiliferous, argillaceous; siliceous to silty; little brown-black opaque chert
- 4609 - 4613 Shale, black, micaceous
- 4613 - 4616 Limestone, brown to black, very finely crystalline, dense, argillaceous, some white granular anhydrite and white typosum, appears to be in place
- 4616 - 4620 Shale, black, micaceous, fissile, some carbonaceous
- 4620 - 4624 Limestone, gray, dark gray, gray-black, black, brown very finely crystalline to finely crystalline, dense, very argillaceous, siliceous
- 4624 - 4628 Shale, black, micaceous, considerable carbonaceous
- 4628 - 4630 Limestone, as above
- 4630 - 4632 Shale, as above
- 4632 - 4637 Limestone, gray to dark brown, very finely crystalline to finely crystalline, dense, argillaceous, considerable granular, very siliceous
- 4637 - 4641 Shale, black, micaceous
- 4641 - 4646 Limestone, gray, gray-black, gray-brown, finely crystalline to slightly crystalline, some granular, dense, siliceous, argillaceous

- 4646 - 4650 Shale, black, gray-black, micaceous, some carbonaceous
- 4650 - 4655 Limestone, gray, gray-black, dark gray, gray-tan, brown, very finely crystalline to slightly crystalline, some granular, dense, argillaceous siliceous to silty
- 4655 - 4657 Shale, as above
- 4657 - 4667 Limestone, gray-black, gray-brown, very finely crystalline, granular dense, dolomitic, argillaceous; some interbedded black shale
- 4667 - 4669 Shale, black, micaceous, splintery
- 4669 - 4699 Limestone, gray, gray-tan, little brown, gray-black and black, very finely crystalline to slightly crystalline, dense, siliceous, argillaceous, some granular; some interbedded black
- 4699 - 4701 Shale, black, micaceous
- 4701 - 4722 Limestone, gray, gray-black, black, buff, tan, very finely crystalline to slightly crystalline, dense, argillaceous, siliceous, with interbedded, black, carbonaceous shale
- 4722 - 4726 Shale, black carbonaceous and gray and red, slightly clayey
- 4726 - 4728 Limestone, gray, gray-brown, gray-black, very crystalline, abundantly fossil fragment
- 4728 - 4750 Shale, black, gray-black, dark gray, gray, green-gray, micaceous, some carbonaceous some waxy, trace very coarse, angular, quartz wash sandstone, limey, pyritic interbedded 4744-50
- 4750 - 4800 Shale, dark gray, green-black, brown, black, micaceous, waxy to coaly; some fissile; traces of pyrite; some splintery
- 4800 - 4848 Shale, green, gray-green, black, micaceous, flakey to waxy; traces of pyrite, siderite; trace gray, medium to coarse, angular to subrounded quartz wash, slightly glauconitic, sandstone in 4840-45 sample
- 4848 - 4858 Sandstone, gray-white, very coarse, angular, very tightly cemented quartz wash, grading into gray-tan and gray-buff, finely crystalline to crystalline, dense, fossil fragment, slightly glauconitic, slightly sandy limestone

- 4858 - 4900 Shale, gray, green, brown, black, micaceous, hard, some waxy; traces of quartz wash sandstone and siltstone
- 4900 - 4937 Shale, dark olive green, black, micaceous, some waxy; traces of pyrite; some interbedded limestone lentils 4918-26, 4934-35
- 4937 - 4941 Shale, black, waxy (very radio-active)
- 4941 - 4942 Limestone, gray, mottled to tan, finely crystalline to slightly coarsely crystalline, some fossiliferous; trace coarse angular imbedded quartz grains
- 4942 - 4949 Shale, black, dark green, waxy
- 4949 - 4956 Limestone, gray, mottled, tan, brown, finely crystalline to slightly coarsely crystalline, some granular; some fossil fragments and dense argillaceous pellets; imbedded very coarse, angular to subangular quartz grains
- 4956 - 4966 Shale, black to gray, micaceous, trace pyrite
- 4966 - 4970 Limestone, gray mottled, tan, brown, finely crystalline to coarsely crystalline, dense, some fossil fragments; some argillaceous pellets; trace granular, glauconitic; trace quartz wash
- 4970 - 4974 Shale, as above
- 4974 - 5000 Limestone, buff, light tan, finely crystalline, dense, very finely sandy, with tiny elliptical oolites
- 5000 - 5038 Limestone, buff, tan, gray, brown, finely crystalline to slightly coarsely crystalline, dense; some medium to coarse dense oolites; some very oolitic; some very finely sandy (Note: Lithology is apparently transitional from Ste. Genevieve to St. Louis)
- 5038 - 5080 Limestone, gray, buff, tan, brown, crystalline, dense, very very oolitic; with lentils of gray, tan, brown, dense sub-lithographic limestone; some slightly dolomitic limestone in circulating samples at TD
- 5080 Total depth - Driller
- 5079 Total depth - Schlumberger

Samples described: (on well)

*Joseph R. Clair*  
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Geological Consultant

DRILLING TIME

Min/5 feet

80 - 180	4-6-5-4-5-3-3-3-3-3	4-3-3-2-2-3-4-5-5-4
180 - 280	4-4-4-4-3-4-6-8-4-4	4-3-3-4-3-4-4-5-4-4
280 - 380	6-4-6-6-10-10-6-6-6-7	8-6-4-4-2-3-3-3-2-1
380 - 480	3-3-3-24-6-2-3-3-3-3	3-3-3-3-5-3-3-3-2-3
480 - 580	8-2-2-6-7-7-6-6-6-13	5-9-8-9-11-11-12-7-8-11
580 - 680	10-14-12-9-12-13-12-12-16-18	13-10-11-13-12-9-9-10-10-11
680 - 780	9-7-20-15-7-9-7-8-6-5	6-6-6-5-10-7-5-5-6-4
780 - 880	4-6-5-6-10-9-8-9-11-9	9-8-12-10-10-10-7-8-8-8
880 - 980	7-5-6-8-7-10-8-8-6-7	9-8-8-5-8-7-8-3-7-6
980 - 1000	7-9-7-8-6	

Min/1 foot

1000 - 20	1-1-1-1-1-1-1-1-1-1	2-1-1-1-2-2-2-2-1-X
1020 - 40	1-2-1-1-1-1-1-1-1-1	1-1-1-1-1-1-1-1-1-1
1040 - 60	1-1-1-1-1-1-1-1-1-3	2-2-2-2-2-2-1-2-1-2
1060 - 80	1-1-1-1-1-1-1-1-1-1	1-1-2-3-3-9-3-1-X-1
1080 - 1100	2-2-4-4-2-3-6-7-7-4	6-1-1-3-2-2-2-2-2-2
		Trip @ 1092
1100 - 20	1-3-1-2-2-2-3-2-X-2	2-2-2-2-2-1-1-1-2-3
1120 - 40	4-3-5-5-4-4-3-3-2-1	1-3-2-3-6-2-2-1-1-1
1140 - 60	1-1-1-2-1-1-1-2-1-1	1-1-3-2-3-3-4-4-5-5
1160 - 80	6-6-7-8-7-8-8-6-5-8	6-5-6-3-3-4-4-6-8-5
1180 - 1200	6-5-6-8-4-2-3-2-2-2	2-2-1-1-1-1-1-1-1- $\frac{1}{2}$ - $\frac{1}{2}$
1200 - 20	1-1-2-7-8-7-7-7-7-8	7-7-7-8-12-8-6-9-7-6

Min/l foot

1220 - 40	8-7-11-10-7-5-5-3-5-2	1-3-1-2-2-9-10-15-9-8
1240 - 60	9-11-12-7-7-12-10-12-11-10	10-8-12-11-11-13-11-15-9-10
1260 - 80	10-13-6-11-5-4-7-6-6-7	5-6-6-6-6-7-6-7-5-9
1280 - 1300	8-2-1-2-2-1-2-2-2-2	2-2-2-1-1-3-4-4-4-4

Trip @ 1282

1300 - 20	3-2-3-4-3-4-3-5-3-2	3-2-3-6-4-5-5-4-5-4
1320 - 40	5-5-2-2-3-3-7-5-5-8	3-5-5-6-3-3-2-2-2-5
1340 - 60	5-6-4-4-4-4-4-4-3-4	6-7-5-7-4-3-6-6-7-8
1360 - 80	7-6-6-5-4-5-4-4-5-6	5-6-5-4-5-5-8-5-7-8
1380 - 1400	7-3-9-9-9-7-8-7-7-6	7-8-7-7-7-9-8-6-6-8
1400 - 20	7-9-5-8-8-8-8-6-8-3	6-5-8-7-6-5-X-5-2-5
1420 - 40	4-4-3-2-2-2-1-1-1-2	1-1- $\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ -1-1-1-1
1440 - 60	2-1-1-1- $\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ -1-2	1-1-1-1-1- $\frac{1}{2}$ - $\frac{1}{2}$ -1-1-2
1460 - 80	2-3-2-4-4-3-4-4-4-4	4-4-4-5-4-5-4-4-4-4
1480 - 1500	4-4-4-4-4-4-3-4-7-5	4-5-5-5-5-5-3-5-3-2
1500 - 20	4-5-5-5-3-4-3-3-4-3	4-5-4-5-4-4-3-5-4-5
1520 - 40	5-4-5-6-5-4-5-5-4-4	3-5-6-6-5-5-4-4-5-5
1540 - 60	5-4-5-5-5-5-7-4-4-4	3-3-4-3-5-5-5-3-4-5
1560 - 80	8-6-6-4-4-4-2-3-4-5	3-5-3-4-7-10-7-3-3-2

Trip @ 1577

1580 - 1600	3-6-4-4-3-3-3-3-3-3	2-3-2-2-3-3-2-3-3-3
1600 - 20	4-5-3-2-4-4-4-3-3-3	2-3-3-4-3-6-3-3-4-4
1620 - 40	4-4-4-3-4-3-3-4-2-3	2-2-3-3-2-3-3-3-2-3
1640 - 60	2-3-2-3-3-2-4-3-3-3	3-3-3-3-3-3-3-3-3-2

Min/1 foot

1660 - 80	3-2-2-2-2-2-2-2-2-2	3-2-3-2-2-2-2-2-1-3
1680 - 1700	3-2-1-2-2-2-1-2-2-1	2-1-3-1-2-2-1-1-1-2
1700 - 20	1-2-3-2-3-3-2-2-3-3	2-2-2-1-2-3-3-4-3-3
1720 - 40	3-3-4-4-3-3-3-3-4-3	4-3-4-4-3-6-3-2-1-3
1740 - 60	3-3-3-4-3-3-3-3-4-4	4-5-6-5-7-6-4-3-5-3
1760 - 80	3-3-4-5-3-2-3-2-3-3	3-3-3-3-3-4-4-4-6-4
1780 - 1800	4-4-7-5-4-5-5-3-5-5	3-4-3-5-5-9-6-4-8-5
1800 - 20	5-6-14-6-9-9-2-4-5-4	5-5-2-2-4-3-4-2-2-4

Trip @ 1807

1820 - 40	5-5-4-3-3-3-3-4-6-5	6-6-5-5-6-5-4-5-5-5
1840 - 60	5-6-6-5-5-6-6-8-7-7	7-4-3-3-2-1-3-2-2-2
1860 - 80	2-3-2-2-3-3-3-3-2-3	3-3-3-1-1-3-3-3-3-3
1880 - 1900	3-3-2-2-1-2-1-2-2-2	1-2-2-2-2-2-1-3-2-4
1900 - 20	2-2-2-2-2-3-2-2-4-3	3-2-2-2-2-2-2-1-1-1
1920 - 40	4-3-2-3-3-3-3-4-3-5	4-4-4-2-2-4-3-3-1-4
1940 - 60	1-4-2-4-2-1-2-2-1-2	2-1-2-2-2-1-2-2-3-2
1960 - 80	1-3-2-1-2-2-1-1-2-2	2-2-2-2-1-1-3-1-3-2
1980 - 2000	1-2-1-2-1-1-2-2-2-1	2-1-2-1-2-2-1-2-2-1
2000 - 20	3-2-2-2-2-2-1-2-2-1	1-2-1-2-1-2-2-2-1-2
2020 - 40	2-2-2-1-1-2-3-2-1-2	2-2-2-2-X-1-2-2-3-2

X-Depth correction

2040 - 60	1-2-1-2-1-2-1-1-2-3	1-2-2-4-2-2-2-2-1-2
2060 - 80	2-3-2-2-X-2-3-2-1-3	3-2-2-2-8-8-7-9-8-8

X-Depth correction

2080 - 2100	8-9-7-8-8-9-10-11-7-7	6-5-6-3-7-4-4-2-5-2
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Min/1 foot

2100 - 20	2½-2½-2-2-2-2-3-2-2-3	2-2-2-2-2-2-4-2-2-2
2120 - 40	2-2-2-3-2-2-2-3-5-4	4-3-4-2-4-3-3-2-1-3
2140 - 60	2-2-2-2-2-3-3-6-4-5	5-4-2-3-3-4-5-4-6-3
2160 - 80	1-1-1-1-2-1-3-1-2-2	3-1-4-2-2-5-2-3-2-2
2180 - 2200	2-2-3-1-1-2-1-2-1-2	2-3-2-3-2-2-3-3-3-2
2200 - 20	2-3-4-3-4-2-3-3-3-3	2-5-4-4-X-X-4-4-3-5
		X- Depth correction
2220 - 40	4-5-5-7-4-3-4-2-3-6	6-5-6-7-7-6-8-4-6-7
2240 - 60	6-5-8-8-7-8-7-X-6-7	8-9-11-9-11-12-12-13-13-9
2260 - 80	10-12-11- 2-13-10-10-10-7-8	8-8-7-8-9-9-9-7-9-14
2280 - 2300	12-11-11-10-10-9-10-10-11-9	10-10-10-8-10-10-10-5-7-7
		Trip @ 2298
2300 - 20	4-4-4-2-2-2-2-1-2-1	1-2-3-2-2-3-4-3-3-3
2320 - 40	2-2-2-2-2-3-3-4-4-3	3-3-3-3-2-3-4-4-4-5
2340 - 60	3-3-3-3-3-4-3-2-2-4	2-2-3-3-2-2-4-2-2-2
2360 - 80	2-2-2-2-2-4-4-3-4-3	3-2-4-3-3-3-3-3-3-3
2380 - 2400	3-3-3-4-3-4-3-3-4-4	3-3-3-4-3-4-4-3-3-3
2400 - 20	4-2-3-3-4-2-1-2-3-3	4-2-3-3-3-4-4-4-4-3
2420 - 40	4-3-3-4-3-5-7-5-3-3-	3-4-4-3-4-4-4-4-4-4
2440 - 60	3-4-3-7-4-4-3-3-3-2	1-3-4-4-4-4-3-5-4-6
2460 - 80	4-4-5-5-7-6-7-3-6-6	6-5-5-4-3-4-9-9-8-6
2480 - 2500	5-7-7-8-7-5-5-5-5-7	6-6-4-5-5-4-4-4-4-5
2500 - 20	4-5-10-7-7-7-7-7-8	8-7-7-8-7-7-7-9-8-11
		Trip @ 2519
2520 - 40	5-4-4-4-5-5-4-3-4-3	3-3-4-4-5-5-4-3-4-4
2540 - 60	3-3-4-4-6-3-3-X-X-5	3-3-3-3-3-4-5-4-3-3

Min/l foot

2560 - 80	3-4-4-5-4-3-3-5-4-3	5-3-5-4-3-4-4-4-2-3
2580 - 2600	(11 ft correction)	X-3-3-3-3-4-6-8-8-8
2600 - 20	6-4-4-3-4-4-3-3-3-3	3-3-3-3-3-3-4-4-5-4
2620 - 40	4-4-4-2-2-4-2-3-3-4	2-4-5-5-6-4-5-5-6-3
2640 - 60	3-4-2-2-2-2-3-4-5-4	4-3-3-5-2-4-3-2-3-4
2660 - 80	3-3-4-3-3-3-2-4-3-3	4-4-4-6-4-3-5-5-4-4
2680 - 2700	5-6-10-8-X-6-6-5-6-5	5-6-4-6-5-6-5-5-5-5
2700 - 20	5-5-4-4-7-5-4-2-4-4	3-5-5-5-4-4-3-5-4-5
2720 - 40	5-5-7-4-5-7-14-7-6-5	4-5-5-7-6-6-6-6-8-8
2740 - 60	8-8-5-7-6-6-5-4-6-5	7-8-10-10-10-8-7-8-5-5
2760 - 80	5-8-4-4-4-4-5-5-6-4	8-9-5-6-6-7-8-6-9-15
2780 - 2800	11-9-11-18-6-6-8-5-4-6	6-5-8-6-8-7-6-9-8-6
2800 - 20	9-13-9-5-3-9-9-12-14-6	5-5-6-6-7-5-6-5-5-4
2820 - 40	7-5-6-6-5-3-5-7-6-4	4-3-5-7-6-7-9-6-5-5
2840 - 60	4-8-6-4-5-8-6-8-7-7	5-4-7-6-5-4-5-5-7-6
2860 - 80	5-6-5-5-5-6-4-4-7-6	6-5-4-5-5-5-5-5-4-5
2880 - 2900	4-4-3-4-4-5-5-4-5-8	8-6-7-7-7-7-5-7-4-4
2900 - 20	7-8-8-8-9-6-7-10-8-10	10-3-3-4-4-4-6-4-4-5 Trip @ 2912
2920 - 40	3-4-4-4-4-4-3-4-4-4	4-4-2-2-3-4-3-4-4-3
2940 - 60	2-2-2-3-1-1-1-1-1-1	2-2-1-2-1-2-1-1-2-2
2960 - 80	1-2-2-2-1-1-2-2-3-2	1-2-2-2-2-3-2-2-2-3
2980 - 3000	3-3-3-4-4-3-4-3-4-4	4-5-2-2-3-5-5-5-5-5
3000 - 20	4-4-4-4-5-5-5-6-6-3	3-4-3-5-5-7-9-8-9-9
3020 - 40	7-9-6-6-6-3-3-8-7-7	8-7-7-7-7-7-6-6-6-6
3040 - 60	7-9-6-5-7-9-6-7-6-6	7-7-6-5-7-9-10-8-5-9
3060 - 80	8-7-5-4-8-10-12-12-15-12	5-10-13-9-8-9-10-8-8-6

Min/l foot

3080 - 3100	7-5-5-7-13-11-9-8-10-4	8-6-5-8-9-7-5-10-10-10
3100 - 20	9-3-3-2-3-5-6-5-3-3	4-4-4-4-4-4-5-5-5-5
3120 - 40	3-2-5-4-4-4-5-5-5-4	5-3-4-4-4-5-4-6-5-3
3140 - 60	4-6-4-4-3-4-4-4-4-5	6-4-4-3-4-5-4-4-4-4
3160 - 80	4-4-4-4-5-7-7-6-6-6	4-5-5-3-4-4-5-5-5-4
3180 - 3200	6-5-5-3-3-4-4-6-4-5	4-4-5-4-5-5-4-4-4-3
3200 - 20	3-2-3-4-3-4-5-4-4-5	5-4-6-3-4-4-4-5-5-4
3220 - 40	4-7-7-8-6-8-6-6-8-7	7-6-5-10-10-12-10-7-7-6
3240 - 60	6-6-6-6-6-5-7-7-6-8	6-6-9-10-10-10-8-9-6-6
3260 - 80	5-6-6-7-11-11-11-8-9-5	6-6-6-4-10-5-6-7-6-6
3280 - 3300	7-7-7-5-6-6-5-5-6-5	6-5-6-6-5-5-4-5-6-4
3300 - 20	6-5-5-6-8-5-13-7-7-7	8-8-5-6-6-7-16-9-8-9
3320 - 40	7-6-5-6-7-6-6-7-7-7	5-6-5-9-6-7-5-5-5-5
3340 - 60	7-7-6-7-7-7-6-7-5-9	9-4-5-6-6-6-5-6-6-4
3360 - 80	4-4-4-4-5-4-3-3-4-5	5-5-5-5-3-1-1-2-5-3
3380 - 3400	5-5-5-4-4-4-4-4-3-4	3-3-3-3-5-4-5-5-3-3
3400 - 20	5-3-4-3-3-4-4-3-3-6	7-9-3-3-8-7-8-10-8-6
3420 - 40	4-6-9-5-6-6-6-5-5-4	4-5-5-5-6-4-5-5-5-5
3440 - 60	5-5-5-5-5-5-4-6-8-10	9-7-6-6-8-6-5-8-6-5
3460 - 80	5-6-5-8-5-10-10-8-7-6	6-6-6-5-6-5-7-7-7-7
3480 - 3500	7-8-5-5-6-5-6-6-7-6	5-4-5-4-5-4-5-5-6-4
3500 - 20	5-7-7-7-6-5-7-6-7-8	5-6-7-7-7-7-4-7-7-7
3520 - 40	9-9-10-x-9-9-9-8-8-9	10-8-8-8-10-10-8-8-10-5
3540-- 60	7-9-9-9-8-8-9-9-9-10	10-9-10-10-14-15-6-5-6-6
3560 - 80	6-7-5-7-7-8-6-7-6-5	4-6-3-5-8-6-8-10-10-7
3580 - 3600	6-5-5-7-5-5-7-10-8-9	9-9-10-12-8-12-12-12-13-8

Min/l foot

3600 - 20	7-7-9-12-13-16-16-11-11-10	10-15-11-11-9-5-X-6-8-8
3620 - 40	9-11-13-9-10-7-8-7-8-10	7-8-6-8-6-5-7-8-6-7
3640 - 60	7-10-7-9-12-9-8-6-7-10	10-8-10-8-9-6-7-6-6-7
3660 - 80	9-11-8-8-7-11-11-7-11-6	6-6-6-6-6-7-5-5-5-5
3680 - 3700	5-6-6-5-6-7-10-9-9-9	10-10-11-10-5-8-8-5-11-13
3700 - 20	12-12-10-11-10-4-4-4-4-3	4-5-5-5-5-4-5-5-4-6

Trip @ 3706

3720 - 40	4-2-3-3-3-5-5-4-5-5	5-5-5-6-8-7-6-7-8-4
3740 - 60	3-6-8-7-6-7-8-9-8-5	7-6-5-5-5-5-8-8-5-7
3760 - 80	5-8-9-6-7-7-9-8-7-8	6-6-5-7-8-8-7-9-8-9
3780 - 3800	7-7-6-5-5-4-4-6-6-5	6-6-4-5-5-6-6-4-6-3
3800 - 20	4-8-7-5-7-7-7-6-9-7	7-6-6-5-7-7-5-7-7-4
3820 - 40	3-3-5-5-8-9-7-8-10-8	8-8-5-5-5-7-9-9-8-9
3840 - 60	8-6-7-4-7-5-6-5-4-4	5-8-11-9-9-9-9-9-8
3860 - 80	6-5-5-4-4-6-6-5-7-9	9-10-8-8-11-8-11-11-10-10
3880 - 3900	9-7-5-5-5-4-3-3-3-2	2-1-1-4-8-3-8-10-8-10
3900 - 20	12-11-11-11-11-13-13-12-13-12	13-6-8-10-10-11-12-8-18-10
3920 - 40	7-8-6-6-8-X-2-4-6-6	6-6-4-9-8-8-7-10-10-8
3940 - 60	10-11-7-8-10-8-10-8-4-5	5-6-5-6-7-5-6-5-4-6
3960 - 80	7-6-7-6-10-11-9-8-9-5	10-9-9-9-9-10-9-8-8-6
3980 - 4000	5-4-4-8-10-9-8-6-5-7	7-4-3-4-4-7-18-10-10-7
4000 - 20	13-10-10-14-12-11-8-15-8-11	7-8-7-9-9-8-9-9-5-5
4020 - 40	7-6-7-7-7-8-5-8-6-5	7-5-3-2-4-5-3-5-8-8
4040 - 60	5-6-6-4-6-7-4-4-7-5	5-6-6-6-6-6-6-6-5-5
4060 - 80	6-8-10-6-6-5-6-6-10-11	12-13-20-20-12-5-10-16-5-18

Trip @ 4074

Min/l foot

4080 - 4100	9-5-7-7-6-4-8-9-7-5	5-9-13-12-10-10-13-9-11-9
4100 - 20	10-7-8-7-7-6-5-5-4-3	2-4-3-5-4-5-6-7-7-6
4120 - 40	5-8-8-5-8-10-8-10-8-10	12-9-5-6-4-1-2-X-X-1
4140 - 60	1-2-5-7-9-9-7-7-10-9	10-9-11-5-13-16-15-17-7-7
4160 - 80	5-6-4-6-9-7-5-6-5-X	5-6-6-7-6-6-5-5-5-6
4180 - 4200	7-7-8-5-5-9-11-11-14-14	13-14-12-11-11-5-6-7-7-8
4200 - 20	10-4-7-9-7-8-8-12-11-10	4-12-11-6-13-16-17-12-12-16
4220 - 40	17-13-16-12-10-10-8-9-10-9	5-5-5-6-6-7-5-5-6-5
	Trip @ 4221	
4240 - 60	9-8-10-11-10-10-8-8-6-9	12-8-8-10-8-10-11-12-14-12
4260 - 80	14-4-4-2-3-11-5-6-7-6	11-7-7-7-10-11-10-11-12-11
4280 - 4300	11-12-10-10-10-10-12-11-9-10	7-7-7-13-12-6-14-12-13-12
4300 - 20	9-9-12-12-12-10-12-13-13-13	19-14-18-14-17-12-4-5-4-4
4320 - 40	4-5-4-13-15-11-6-5-5-16	12-10-7-8-9-6-5-5-9-17
4340 - 60	11-11-12-13-20-15-15-11-13-10	7-4-6-8-6-9-6-5-7-5
4360 - 80	6-5-5-9-6-6-6-6-6-7	6-6-7-5-3-5-5-5-9-9
4380 - 4400	11-7-6-6-7-3-6-9-9-10	6-6-10-7-7-6-6-8-8-6
4400 - 20	7-9-7-8-6-10-10-10-11-8	12-9-4-10-10-6-4-6-6-11
4420 - 40	13-10-6-6-4-6-10-15-8-5	5-7-6-3-5-6-5-5-10-7
4440 - 60	8-7-5-4-7-10-10-10-4-8	5-3-3-4-2-4-8-6-8-9
4460 - 80	12-11-6-6-10-11-6-5-5-6	5-6-6-9-5-12-7-14-6-6
4480 - 4500	9-10-12-12-14-12-4-5-5-5	5-4-9-7-7-5-4-5-2-7
4500 - 20	13-7-8-7-6-7-10-9-7-9	9-5-8-13-7-9-4-6-8-8
4520 - 40	10-4-10-9-13-10-4-7-4-3	3-6-6-3-4-3-13-10-13-X
4540 - 60	9-11-9-11-12-13-14-8-11-11	11-11-12-12-9-6-7-11-5-7

Trip @ 4555

Min/l foot

4560 - 80	7-10-7-4-8-12-6-6-9-4	6-7-2-3-4-7-4-3-2-8
4580 - 4600	7-10-7-8-10-7-11-3-8-4	7-5-3-3-7-5-9-5-6-9
4600 - 20	11-8-X-6-7-4-8-7-7-8	12-6-2-2-3-5-12-6-6-3
4620 - 40	3-3-2-8-10-6-3-2-3-2	7-10-3-2-5-8-10-7-8-5
4640 - 60	4-3-12-3-9-11-8-5-4-4	5-4-5-8-8-9-7-2-9-8
4660 - 80	5-10-7-2-7-5-4-6-6-3	5-8-6-7-7-9-9-8-6-6
4680 - 4700	8-9-4-5-10-10-9-9-6-7	10-12-9-8-7-X-8-9-9-10
4700 - 20	5-8-3-6-8-9-8-7-10-6	9-4-9-10-8-4-6-2-8-9
4720 - 40	9-6-12-8-3-5-4-3-5-9	6-8-4-4-5-4-5-5-4-4
4740 - 60	5-5-4-5-5-6-6-4-3-9	4-7-6-5-4-4-5-5-4-6
4760 - 80	6-6-6-6-6-5-5-5-7-5	6-6-6-6-5-6-6-7-6-6
4780 - 4800	5-5-6-5-7-5-6-8-6-X	7-7-6-7-6-6-4-5-3-3
	Trip @ 4790	
4800 - 20	5-4-3-4-4-3-4-3-3-5	5-3-4-4-4-3-5-5-5-4
4820 - 40	4-3-2-2-2-3-2-3-2-3	2-3-3-3-3-3-4-5-3-4
4840 - 60	3-4-3-4-4-3-5-4-4-5	9-12-5-2-4-4-4-5-5-4
4860 - 80	4-4-4-5-4-5-4-4-4-5	4-5-5-5-4-5-5-8-6-5
4880 - 4900	5-X-4-3-5-3-4-4-4-5	4-6-4-6-4-4-5-6-4-4
4900 - 20	5-3-4-3-4-4-4-4-4-4	4-5-4-3-3-4-4-4-4-4
4920 - 40	6-4-4-4-3-4-4-2-4-4	5-4-4-4-4-8-7-5-3-3
4940 - 60	5-X-X-5-12-5-5-5-4-5	5-10-14-15-14-10-8-15-7-8
4960 - 80	5-7-7-5-6-7-5-5-12-17	12-11-11-19-7-8-15-17-18-10
		Trip @ 4979
4980 - 5000	15-13-11-11-18-16-7-10-11-11	10-10-11-11-11-10-9-11-14-20
5000 - 20	16-12-12-12-14-14-15-20-9-11	14-14-8-11-12-12-14-17-16-17

Min/1 foot

5020 - 40	16-16-17-18-18-20-18-15-17-18	17-21-15-17-17-20-18-19-19-21
5040 - 60	18-11-10-9-14-13-13-11-13-13	8-9-13- 10-13-9-9-12-11-14
5060 - 80	14-14-15-28-11-16-12-X-5-15-19	Trip @ 5050 14-17-17-11-14-14-13-14-13-12

Total Depth - 5080

Chandler Musgrove, Inc.  
Colorado State B-1

BIT RECORD

<u>NO.</u>	<u>SIZE</u>	<u>MAKE</u>	<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>FOOTAGE</u>	<u>HOURS</u>
1	12-1/2	HTC	OSC-3	47	1091	1044	26
2	12-1/2	HTC	OSC-3	1091	1281	190	17
3	12-1/2	HTC	OSC-3	1281	1577	296	22
4	12-1/2	HTC	OSC	1577	1806	229	13
5	12-1/2	HTC	OSC	1806	2165	359	17-3/4
1	7-7/8	Smith	K2D	2165	2297	132	10-3/4
2	7-7/8	HTC	OWV	2297	2518	221	14-1/2
3	7-7/8	HTC	OWV	2518	2758	240	16-1/2
4	7-7/8	HTC	OWV	2758	2911	153	16-1/4
5	7-7/8	HTC	OWV	2911	3100	189	17
6	7-7/8	HTC	OWV	3100	3351	251	23-1/2
7	7-7/8	HTC	OWV	3351	3556	205	21-1/4
8	7-7/8	Smith	SV2	3556	3705	149	20-1/4
9	7-7/8	HTC	OWV	3705	3917	212	23-3/4
10	7-7/8	HTC	OWV	3917	4074	157	19-3/4
11	7-7/8	HTC	OWV	4074	4221	147	19-3/4
12	7-7/8	HTC	W-7	4221	4350	129	21
13	7-7/8	HTC	OWV	4350	4555	205	25-1/2
14	7-7/8	Security	M4N	4555	4790	235	24-3/4
15	7-7/8	Security	M4N	4790	4979	189	15-1/2
16	7-7/8	Security	M4N	4979	5049	70	16-1/2
17	7-7/8	Smith	3C4	5049	5080	31	7

**OPEN HOLE TEST**

**JOHNSTON TESTERS, INC.**

OFFICES: Houston, Texas - Los Angeles, California - Calgary, Canada

DATE 6-19-57  
 OPEN HOLE TEST NO. 1 WELL: Colorado State Well # B-1  
 FIELD Wild Cat COUNTY Iowa STATE Colorado  
 COMPANY Chandler-Musgrove Inc.,  
 ADDRESS 210 Denver Club Building, Denver, Colorado  
 TEST APPROVED BY Joseph R. Clair  
 JOHNSTON OPERATOR N.E. Smith TICKET NO. 27354 N

GENERAL TEST DATA

TYPE TEST <u>Conventional</u>		TOTAL DEPTH <u>4350'</u>	
1. Test Interval: <u>4324'</u>	To <u>4350'</u>	7. Fluid Cushion: Type <u>None</u>	Amount _____
2. Tool Open _____	Hrs. <u>15</u> Min _____	8. Air Chamber Amount <u>90'</u>	Size: <u>2 1/2" ID</u>
3. Initial Shut In _____	Hrs. <u>15</u> Min _____	9. Did Packer (s) Hold? <u>Yes</u>	
4. Final Shut In <u>-</u>	Hrs. _____ Min _____	10. Did Tool Plug? <u>No</u> Where? _____	
5. Choke: Top <u>3/4"</u>	Bottom <u>1/2"</u>	11. Was Test Reversed Out? <u>No</u>	
6. Fluid Recovery <u>5'</u> Total,			
<u>5' drilling mud.</u>			

REMARKS:

Reset tool after 10 minutes and dropped second bar.

SURFACE INFORMATION

1. Blow: <u>None.</u>	Did Well Flow? <u>No</u>
2. Maximum Surface Pressure <u>-</u>	Size Surface Choke <u>3/4"</u>
Description Or Rate of Flow _____	Time _____
_____	Max. Pressure _____
_____	_____
_____	_____
_____	_____

MUD, HOLE, & TOOL DATA

MUD, HOLE & JOHNSTON TOOL DATA

MUD: Type Gel., Weight 9.3 Viscosity 60  
 HOLE: Main Hole Size 7 7/8" Drill Pipe Size 4 1/2" FH  
 Rat Hole Size -  
 JOHNSTON TOOLS:  
 1. Packer (s): Type B.T. O.D. 6 3/4" Type \_\_\_\_\_ O.D. \_\_\_\_\_  
 Set At 4324' Set At \_\_\_\_\_  
 2. Extra Equipment:  
Johnston jars, Bowen safety joint.





273 54 N

T-2 55

3000 #

5T

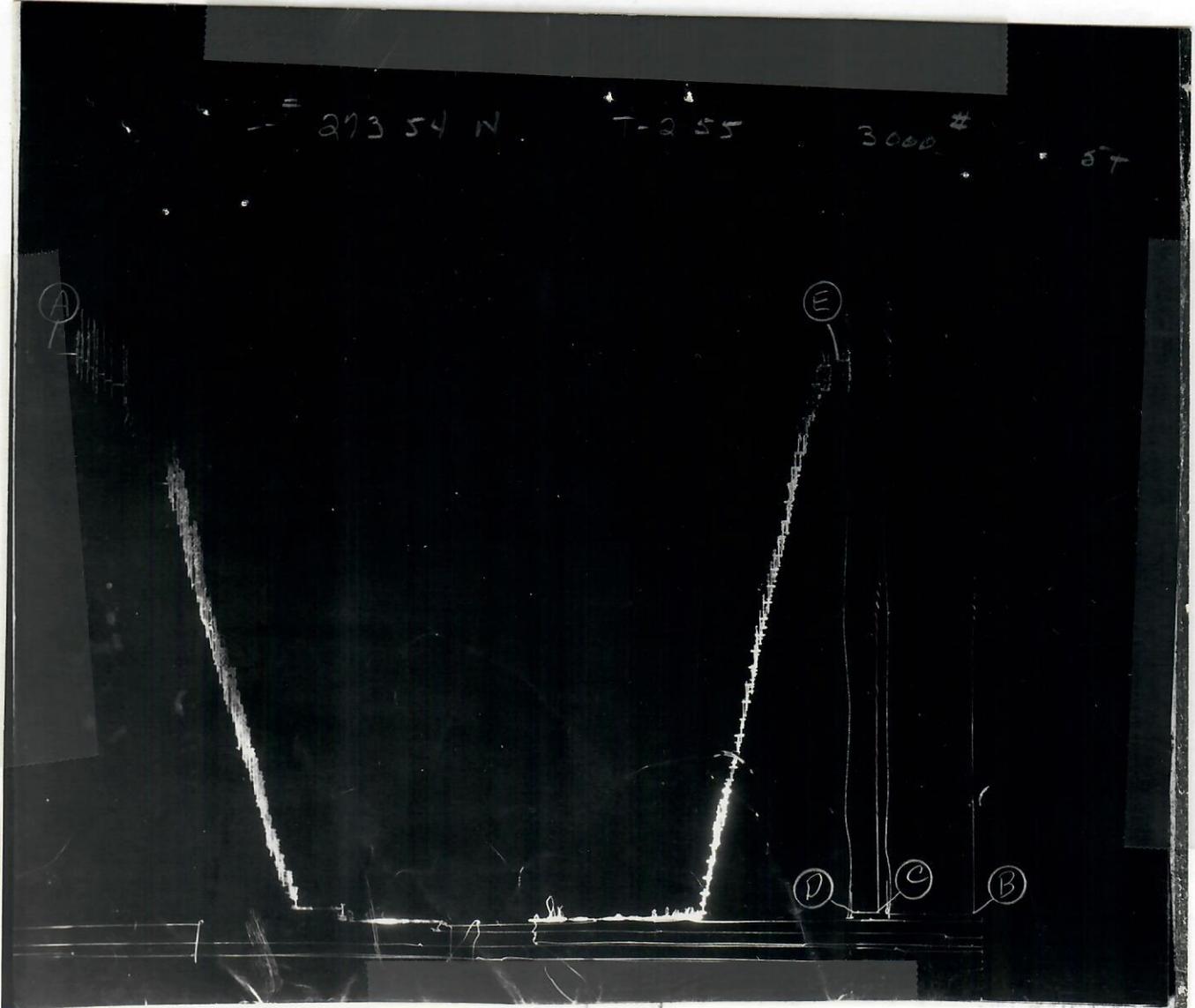
(A)

(E)

(D)

(C)

(B)



# [REDACTED]  
TT 27354 N

