

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 55

Summary of the Palmer H. Dilland #1

Williams County, North Dakota

Well #35, Permit #51

By Carole Smith
March 1954

Amerada Petroleum Corporation - Palmer H. Dilland #1 Williams County, North Dakota C SW 1/4, NE 1/4 (1950' south of North line, 1990' west of East line): Section 31, T. 156N., R. 95W., Elevation: 2316 G.L., 2329 R.B.

The Palmer H. Dilland #1 was spudded August 12, 1951 and 13 3/8" casing was run at 502 with 350 sacks; 9 5/8" casing was run at 6014 with, 1500 sacks; 5 1/2" casing at 10,823 with 2000 sacks. Well completed April 26, 1952 as a producer with a total depth, of 13,325 feet. I.P. 503/43.0/1/4"

CORES

10,442-10,455
10,912-10,942
11,572-11,636
11,638-11,703
11,733-11,812
11,815-11,837
13,221-13,325

TESTS

DST #1 8101-8172: Open 1 hr., shut in 15 min., weak blow 23 min. and died, recovered 40' very gas cut mud, HP 4900#, BHP 0#.

DST #2 8225-8330: Open 1 hr., 43 min., immediate good flow of air, recovered 300' gas cut mud and 3830' rotary mud, HP 4730#, IFP 0#, FFP 30#.

DST #3 5328-8393: Open 1 hr. 2 min., recovered 270' gas cut mud with sulfur odor, 180' rotary mud, HP 4690#, IFP 0#, FFP 30#.

DST #4 8396-8444: Open 4 hrs., gas to surface in 40 min., oil to surface in 22 min., cst. 50 bbls, per hr., 40°, IFP 1000#, FFP 1150#, BHP 3050#, HP 3900#.

Repeat DST #4: 8395-8444: Open 4 hr., shut in 15 min., gas to surface in 4 min., oil to surface in 22 min., gauges: 1st hr. 49.32 bbls., 2nd hr, 54.80 bbls., 3rd hr. 56.54 bbls., 4th hr. 57.54 bbls., 40° gravity, gas volume 2,491,000 CFPD, IFP 1000#, FFP 1150#, BHP 2050#, HP 3900#.

DST #5 8444-8469: open 4 hrs. 45 min., shut in 15 min., gas to surface in 4 min., oil to surface in 30 min., gauged 1st hr. 33.32 bbls., 2nd hr. 43.56 bbls., 3rd hr, 43.88 bbls., 4th hr. 38.44 bbls., 40° gravity, gas volume 1,604.862 CFPD, HP 5200#, IFP 2400#, BHP 3900#.

DST #6 8469-8499: Open 5 hrs. 50 min., shut in 15 min., gas to surface in 16 min., oil to surface in 2 hrs., 45 min., gauged first hour 28.36 bbls., second hour, 8.16 bbls, third hour, 21.76 bbls., 40° gravity; HP 5350#, IFP 1250#, FFP 1000#, BHP 3900#.

DST #7 8499-8529: Open 1 hr. 40 min., shut in 15 min., gas to surface in 4 min., oil to surface in 25 min., gauged 57.24 bbls., in 1 hr. 15 min., 40° gravity, gas volume 80, 518 CF hr., HP 5200#, FP 2000#, BHP 3750#.

DST #8 8529-8559: Open 1 hr., shut in 15 min., fair blow for 3 min., light blow for 2 min. and died, recovered 1000' of very slightly gas cut mud, HP 5000#, FP 50#, BHP 50#.

DST #9 8587-8620: Open 1 1/2 hrs., shut in 15 min., light blow for 32 min., recovered 96' gas cut mud, HP 5080#, IFP 40#, FFP 60#, BHP 160#.

DST #10 8560-8690: Open 1 hr., shut in 15 min., light blow for 30 min. and died, recovered 273' gas cut mud, HP 4810#, IFP 95#, FFP 110#, BHP 200#.

DST #11 8726-8755: Open 1 hr. 15 min., shut in 15 min., very weak blow and died recovered 40' gas cut mud, HP 4860#, no other pressures.

DST #12 10,390-10,455: Open 2 hrs. 20 min., shut in 25 min., weak blow, recovered 2000' gassy muddy water cushion, 280' of very frothy oily textured gas cut mud, HP 6900#, IFP 850#, FFP 950#, BHP 3150#.

DST #13 10,455-10,491: Open 2 hrs., shut in 15 min., fair to light blow and died, recovered 2000' water cushion, 240' gas cut mud with slight oil odor, HP 5745#, IFP 910', FFP 1065#, BHP 3920#.

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DST #14 11,540-11,731: Open one hr. 39 min., shut in 15 min., air immediately, weak blow for 3 min. and died, recovered 3300' water cushion, 90' muddy water, 768' slightly gas cut mud, HP 6510#, IFP 1540#, FFP 1540#.

DST #15 11,730-11,812: Open 4 hrs., shut in 15 min., weak to fair blow, recovered 3400' of water cushion with gas odor and 534' of slightly oily and heavily gas cut mud. HP 5750#, IFP 1550#, FFP 1700#, BHP 3100#.

DST #16 11,804-11,950: Open 3 hrs. 42 min., shut in 18 min., fair blow for 22 min., weak blow for 26 min., died for 8 min., weak blow for 1 1/2 hr., took shut in pressure and reset tool, fair blow for 21 min., weak blow for 55 min., recovered 3450' of gassy water cushion, 720' very gas cut mud with oily texture, HP 6505#, IFP 1585#, FFP 1850#, BHP 3820?#.

DST #17 11,950-12,082: Open 4 hrs., shut in 15 min., good blow throughout, recovered 3662' water cushion, with slightly salty taste, 1956' salty gas cut muddy water and frothy gas cut watery mud and 30' salt crystals, IFP 1640#, FFP 2595#, BHP 4810#, HP 6550#.

DST #18 13,212-13,267: Open 30 min., fair blow, packer failed.

DST #19 13,200-13,325: Open 1 hr. 37 min., shut in 15 min., fair to weak blow for 52 min. and died; recovered 5060' water cushion and 469' of fluffy rotary mud, HP 7550#, no other pressures recorded.

DST #19 (run 2)13,181-13,325: Open 3 hrs. 47 min., shut in 15 min. very weak blow and died, recovered 5000' water cushion and 161' of rotary mud, tool was plugged, no test.

TOPS

Pierre	1453
Niobrara	2965
Greenhorn	3864
"Muddy "	4326
Dakota	4600
Morrison	5002
Sundance	5185
Piper	5726
(Plus 200 feet of unidentified moderate reddish brown fine grained sandstone, Piper? Permian ? Pennsylvanian?)	
Spearfish	6222
Amsden	6732
Heath	6988 (radioactivity log)
Kibbey	7416 (radioactivity log)
Charles	7590
Mission Canyon	8178 (radioactivity log)
Lodgepole	8462
Englewood	9736
Lyleton	9923 (9860 on sample log?)
Nisku	10,040
Duperow	10,135
Souris River	10,548
Dawson Bay	10,850
Ashern	11,620 ? (sample log)
Stonewall	11,660 ? (sample log)
Stony Mountain shale	12,850 ? (sample log)
Red River	12,925 ? (sample log)
Total Depth	13,325

Rock colors were determined from the rock color chart. Formation tops were picked from electric log, radioactivity log, and sample log-down through the Manitoban. Lacking logs, the rest of the tops (after 10,825') were picked on the basis of samples alone.

<u>From</u>	<u>To</u>	<u>Formation</u>
3880	3900	Calcareous shale--medium dark gray; traces of limestone.
3900	3950	Calcareous shale--medium gray, flaky, with white specks.
3950	4000	Calcareous shale--medium dark gray with white specks, flaky; scattered Inoceramus fragments.
4000	4050	Shale--medium dark gray, flacky, slightly calcareous, scattered traces of Inoceramus fragments.
4050	4070	Shale--medium dark gray, flaky with white specks, slightly bentonitic (?); traces of pyrite.
4070	4120	Shale--medium dark gray, flaky, white specks diminishing; traces of pyrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
4120	4170	Shale--medium dark gray, flaky, white specks; scattered Inoceramus fragments.
4170	4230	Shale--medium gray to medium dark gray, increasingly firm; scattered traces of Inoceramus fragments; trace of glauconitic sandstone at 4220.
4230	4260	Shale--medium light gray to medium dark gray, rather firm; traces of sub-rounded quartz.
4260	4320	Shale--medium light gray to medium dark gray, rather firm with a few white specks; scattered traces of Inoceramus fragments; pyrite.
4320	4370	Shale--medium light gray to medium dark gray, a few white specks, scattered traces of Inoceramus fragments; some loosely consolidated, poorly sorted sandstone, becoming very fine grained and partly iron stained and well cemented.
4370	4400	Shale--medium light gray to medium dark gray, some white specks; traces of Inoceramus fragments; small amounts of sandstone as above.
4400	4420	Shale--medium gray to medium dark gray, flaky, a few white specks.
4420	4450	Shale--medium gray, very flaky, some white specks; traces of pyrite and Inoceramus fragments.
4450	4480	Shale--medium light gray to medium dark gray, some white specks, traces of Inoceramus fragments and limestone; trace of fine grained, well cemented sandstone at 4470 (cave?).
4480	4580	Shale--medium light gray to medium dark gray, some white specks; traces of Inoceramus fragments; small amounts light gray, fine grained sandstone, increasing slightly in quantity.
4580	4600	Shale--as above; some quartzose, fine grained sandstone.
4600	4630	Shaly sandstone and sandy, silty shaly--medium dark gray, firm; small amounts of white, quartzose sandstone.
4630	4660	Shale--medium dark gray, firm; small amounts of medium light gray, very fine grained sandstone.
4660	4720	Shale--medium gray to medium dark gray, some light gray; small amounts of quartzose sandstone as above; scattered traces of pyrite.
4720	4790	Shale--medium dark gray, some light brownish gray; small amounts of quartzose sandstone as above, decreasing in quantity
4790	4900	Shale--medium light gray to medium dark gray, some soft, light brownish gray shale beginning at 4800; traces of glauconitic sandstone and quartzose sandstone.
4900	4910	Shale--medium light gray to in medium dark gray, some white spots; some greenish gray and grayish red shale; traces Inoceramus fragments and sandstone.
4910	4960	Shale--as above, plus small amounts of moderate reddish shale and light brownish gray, soft shale; traces of quartzose sandstone and pitted light brown to pale orange quartz.

<u>From</u>	<u>To</u>	<u>Formation</u>
4960	5080	Shale--medium gray to dark gray; some light brownish gray, soft shale (4960-4970); small amounts of salt and pepper, coarse to fine grained, quartzose sandstone, disappearing at 5030; traces of reddish, pale purple and grayish red purple shale beginning at 5000; plus scattered traces of pyrite.
5080	5100	Shale--medium dark gray with white specks; small amounts of multi-red shale and light brown bentonite; traces of pyrite and sandstone as above.
5100	5150	Shale--light gray to medium dark gray, partly limy, slightly silty and bentonitic; a trace of glauconitic, fine grained sandstone beginning 5100 traces light gray, fine grain andstone at 5130.
5150	5200	Shale--medium gray; small amounts of reddish shales and gray sandstones (partly glauconitic) as above.
5200	5230	Shale--medium gray to medium dark gray; small amounts of fine grained, light gray sandstone; traces of dolomitic limestone beginning at 5220.
5230	5260	Shale--medium dark gray; some slightly silty, light brownish gray shale; small amounts of fine grained sandstone as above, partly glauconitic; traces of micro-sugary limestone.
5260	5380	Shale--medium dark gray and greenish gray; small amounts of limy, fine grained, salt & pepper sandstone, traces of pink anhydrite beginning at 5320; traces of dusky yellow, fine grained sandstone beginning at 5350.
5380	5410	Shale--medium gray to medium dark gray; some greenish gray and brownish red shale; scattered traces of sandstone as above and frosted light brown quartz.
5410	5430	Shale--as above; plus traces of light gray, fine grained sandstone.
5430	5460	Shale--medium gray to medium dark gray, partly greenish gray and calcareous; much fine grained sandstone limy, partly glauconitic; small amounts of slightly silty, brownish gray shale; traces of pyrite.
5460	5470	Sandstone--fine grained, limy, light gray, partly glauconitic; some shale as above.
5470	5500	Shale--medium dark gray; some greenish gray, calcareous shale, small amounts of glauconitic sandstone; traces of reddish brown shale beginning at 5490.
5500	5510	Missing samples.
5510	5530	Shale--gray and calcareous greenish gray as above, partly reddish brown, small amounts of fine grained sandstone.
5530	5560	Shale--medium light gray to medium dark gray; small amounts of reddish brown and greenish gray shale; traces of fine grained, white to light brown sandstone; traces of white gypsum (5550-5560).
5560	5580	Shale--light gray to medium dark gray; slightly silty; some pale green and reddish shale, traces of light olive brown shale beginning at 5570; small amounts of fine grained sandstone.
5580	5590	Shine--gray, as above; much reddish shale; some light greenish gray shale; traces of fine grained, white, slightly calcareous sandstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
5590	5640	Missing samples.
5640	5660	Shale--gray and light greenish gray; small amounts of reddish shale, some fine grained, white, slightly calcareous sandstone.
5660	5690	Shale--light gray to medium dark gray; some reddish, greenish, and yellowish shale appearing at 5670; small amounts of white to light gray, fine grained sandstone; traces of limestone (5670-5680).
5690	5700	Shale--variegated shales as above, plus some waxey, medium green, calcareous shale; traces of light brown, fine grained sandstone.
5700	5730	Shale--light gray to medium dark gray; some reddish shale and light green gray shale; small amounts of fine grained, salt and pepper sandstone; traces of dense, gray limestone (5710-5720).
5730	5780	Shale--gray, reddish, and gray green shale as above, small amounts of white to pinkish, to pale yellow gray, dense limestone beginning at 5740; traces of sandstone as above.
5780	5810	Shale--variegated and somewhat limy as above; some pale dense limestone increasing greatly in quantity at 5790.
5810	5830	Shale--gray, reddish, and greenish as above; small amounts of white and pinkish anhydrite.
5830	5860	Shale--variegated as above; some dense, grayed yellow and pink limestone.
5860	5870	Shale--gray, reddish, greenish, olive; much dense white limestone; a small amount of anhydrite.
5870	5880	Shale--variegated as above; much medium grained, white, partly, yellow and pink tinged sandstone; some dense limestone.
5880	5900	Shale--as above, plus some silty brownish gray shale, some fine grained, calcareous, salt and pepper sandstone; some pale grayed yellow and pink limestone (5890-5900).
5900	5930	Shale--reddish, greenish, gray; much medium grained, grayish yellow orange pink sandstone; a small amount of white anhydrite (5920-5930).
5930	5990	Shale--gray, greenish gray (calcareous); reddish, light olive brown; some light yellow gray, fine grained sandstone; traces of white anhydrite; some moderate reddish orange brown sandstone appears at 5980.
5990	6015	Shale--variegated as above; much moderate reddish orange brown; medium grained sandstone.
6015	6040	Sand--quartz, rounded, pitted, partly iron stained; some sandstone as above, increasing greatly at 6030, small amounts of gray shale.
6040	6050	Sandstone--reddish orange brown; small amounts of quartz sand as above.
6050	6120	Silt--reddish orange brown; small amounts of quartz sand as above.
6120	6150	Sandstone--fine grained, reddish orange brown, some salt and pepper; traces of shale, pyrite, magnetite, and quartz sand as above.

<u>From</u>	<u>To</u>	<u>Formation</u>
6150	6190	Sandstone--moderate reddish orange brown, fine-grained; small amounts of fine grained, pale blue-green sandstone, traces of sand as above.
6190	6250	Sandstone--moderate reddish orange brown, fine grained; small amounts of medium gray shale, pitted quartz, salt and pepper sandstone, magnetite (?)
6250	6290	Gypsum--white, fluffy, crust-like; some yellowish salt; some sandstone and shale as above.
6290	6310	Salt--(halite) vitreous, crystalline; some sandstone and shale as above.
6310	6330	Sandstone--reddish brown as above; dark gray and greenish shale; traces of gypsum.
6330	6390	Salt (halite)--as above; sandstone as above, increasing greatly at 6370; missing samples; 6360-6370.
6390	6410	Salt (halite)--traces of sandstone as above.
6410	6450	Sandstone--reddish brown as above; much halite, increasing at 6430.
6450	6460	Salt (halite)--some reddish sandstone; gray and green shale.
6460	6520	Sandstone--reddish brown as above; somewhat blue-tinged gray shale.
6520	6560	Sandstone--as above, much salt (halite), decreasing rapidly at 6540.
6560	6640	Sandstone---as above, much salt (halite); traces of gray shale.
6640	6720	Sandstone--reddish brown as above; small amounts of salt; missing samples: 6670-6700.
6720	6730	Missing samples.
6730	6740	Sandstone---reddish brown as above; some black and gray green shale.
6740	6750	Salt (halite); some sandstone and shale as above.
6750	6760	Salt (halite); much dense, pale yellow and pink dolomite; some shale as above.
6760	6800	Dolomite--grayish pink, very fine grained, becoming denser and resinous, pale olive gray; small amounts of sandstone and shale as above.
6800	6820	Dolomite--olive gray, pale pink, pale purple, dense, becoming almost white; small amounts of sandstone and shale as above.
6820	6840	Anhydrite--dense, white to very light gray; increasing amounts of dolomite as above; small amounts of sandstone and shale.
6840	6870	Dolomite--resinous olive gray, dense off white and pink; some anhydrite as above; small amounts of reddish sandstone and dark gray shale; much rounded, fine quartz (6860-6870).
6870	6900	Dolomite--light olive gray to off white, very fine grained; some variegated shales increasing greatly in quantity; small amounts of sandstone and salt; much rust staining.
6900	6920	Shale--grayish red purple, orange brown, medium gray green, light olive brown, gray; some dolomite and anhydrite.
6920	6960	Shale--dark gray, partly grayish green, firm; small amounts of dolomite and variegated shales; missing samples: 6930-6950.

<u>From</u>	<u>To</u>	<u>Formation</u>
6960	6970	Missing samples.
6970	6980	Shale--variegated, especially reddish and dark gray.
6980	6990	Missing samples.
6990	7010	Shale--dark gray, carbonaceous; some variegated shales.
7010	7020	Missing samples.
7020	7180	Shale--dark gray, carbonaceous, traces of dolomite, pyrite, and variegated shale; missing samples: 7040-7050.
7180	7200	Shale--gray black, carbonaceous; small amounts of variegated shale and pale, dense, dolomitic limestone.
7200	7290	Shale, as above; traces of pale, dense dolomitic.
7290	7300	Shale--black, reddish, olive, pale purple, pale yellow brown; traces of pyrite and dense white anhydrite.
7300	7320	Shale--as above, much medium grained, white sandstone becoming partly light brown.
7320	7330	Missing samples.
7330	7420	Shale--black and variegated as above; much grayish orange pink, fine grained sandstone, slightly calcareous.
7420	7450	Sandstone--pale red, medium grained to very fine grained, becoming almost white; increasing amounts of black and variegated shale as above.
7450	7480	Shale--black, reddish purple, yellow olive, gray green, purple, some white anhydrite; increasing amounts of fine grained, reddish sandstone; traces of light gray, dense limestone.
7480	7580	Shale--dark gray to black, partly variegated as above, small amounts of gray and reddish brown, fine grained sandstones, becoming yellow brown at 7520; much reddish shale beginning at 7540.
7580	7600	Anhydrite--dense, almost white; some black and variegated shales.
7600	7620	Variegated as above, traces of pyrite.
7620	7630	Salt (halite); much black, reddish and greenish shale.
7630	7770	Salt (halite); small amounts of black and reddish shale, increasing greatly in quantity at 7760.
7770	7780	Shales--dark gray and reddish small amounts of soft white gypsum.
7780	7800	Salt (halite); increasing amounts of gray and reddish shales, some silty, light brown shale (7790-7800).
7800	7820	Shale--dark gray to black, some reddish, purple, pink, and greenish increasing amounts of dense white to very light gray anhydrite.
7820	7830	Shale--as above; much salt (halite); traces of anhydrite and pyrite and sandstone.
7830	7920	Salt (halite); decreasing amounts of black and reddish shale; missing samples: 7870-7910.
7920	7940	Salt (halite); much variegated, partly calcareous shale; much, calcareous light brown silt (7930-7940).
7940	7950	Shale--black, reddish, calcareous, light gray and purple; some white anhydrite.
7950	7960	Calcareous silt--very light brown, partly clay; much shale as above; small amounts of white anhydrite.
7960	7980	Shale--black, partly reddish, gray, green; much calcareous silt, as above.

<u>From</u>	<u>To</u>	<u>Formation</u>
7980	8015	Anhydrite--white; some yellow olive, reddish, dark gray, greenish and brownish shale, increasing greatly in quantity; traces of pyrite.
8015	8030	Salt (halite), much variegated shale; traces of white anhydrite.
8080	8040	Salt (halite), small amounts of black and reddish shale.
8040	8050	Shale--light gray to dark gray, some reddish, purplish, and greenish, traces of salt and anhydrite.
8050	8060	Missing samples.
8060	8100	Shale--variegated as above; some white anhydrite, decreasing in quantity; some dense, yellow brown dolomite beginning at 8070.
8100	8110	Shale--black, reddish, greenish, and gray; small amounts of dense gray anhydrite.
8110	8160	Dolomite--yellow brown, dense, somewhat resinous; much variegated shale.
8160	8230	Shale--black, pink, moderate red, purple, gray, greenish, partly calcareous; some dolomite as above (8160-8170); small amounts of white anhydrite.
8230	8250	Shale--variegated; some dense, rather resinous, yellow brown dolomite.
8250	8280	Anhydrite--dense, blue gray and almost white; some variegated shale, increasing in quantity; small amounts of dense dolomite.
8280	8290	Shale---variegated; some dense dolomite as above; some dense, yellow brown, dolomitic limestone.
8290	8310	Shale--variegated; much resinous, yellow brown dolomite; much dense, almost white, dolomitic limestone beginning at 8300; small amounts of dense, white anhydrite.
8310	8320	Shale--variegated; much dense, white and pale blue anhydrite; small amounts of dolomitic limestone as above.
8320	8350	Dolomitic limestone--yellow brown, rather resinous; some reddish, greenish, and dark gray shales; some pale, dense dolomite (8320-8330); small amounts of white anhydrite.
8350	8438	Dolomitic limestone--dense, yellow brown, rather resinous, some is micro-sugary, very light brown; some variegated, partly limy shale; traces of dense white dolomite beginning at 8390; some dense, almost white limestone (8435-8438).
8444	8520	Dolomitic limestone--light olive gray, dense, minutely vuggy in part, becoming less dolomitic; some calcareous, variegated shale; scattered traces of dolomite, pyrite, anhydrite.
8520	8527	Limestone--light olive gray, dense, somewhat resinous, almost white in part; some calcareous, variegated shale as above.
8527	8550	Limestone--yellow gray, somewhat brown and green tinged, dense; much reddish, purple, black, and green shale; small amounts of dense almost white dolomite and anhydrite.
8550	8570	Limestone--yellowed gray, somewhat brownish, dense, somewhat resinous; some shale as above, increasing greatly in quantity at 8559; small amounts of dense, almost white dolomite and anhydrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
8570	8610	Limestone--yellowed gray, somewhat brownish, dense, slightly dolomitic, rather resinous; some almost white, micro-sugary limestone (8570-8587); small amount of variegated shale, increasing greatly in quantity 8587-8590; small amounts of white anhydrite and dolomite.
8610	8690	Limestone--yellow gray, somewhat brownish, dense, somewhat resinous, some is very pale, sublithographic; small amounts of reddish and gray and greenish shale; traces of dense dolomite and anhydrite.
8690	8700	Limestone and shale as above; much calcareous, reddish siltstone.
8700	8742	Limestone--grayed and brownish, micro-sugary, slightly dolomitic, some is pale and chalky; small amounts of gray shales; traces of anhydrite, reddish sandstone and pyrite.
8742	8755	Limestone--yellow gray, somewhat brownish, micro-sugary to chalky; small amounts of gray, green, and reddish shales.
8755	8800	Limestone--as above, increasingly chalky; small amounts of reddish, fine grained sandstone ending at 8770; small amounts of gray, reddish, and greenish shale.
8800	8880	Limestone--yellow gray, micro-sugary; much very pale yellow brown chalky limestone beginning at 8810; small amounts of shale as above; scattered traces of white anhydrite increasing greatly in quantity at 8870.
8880	8890	Limestone--pale yellow to white, micro-sugary to chalky; small amounts of shale and dense, white, limy dolomite.
8890	8940	Limestone--dark gray, brownish, almost white, somewhat pink tinged, micro-sugary to chalky; traces of gray, reddish, greenish and brownish, partly calcareous shales; traces of white anhydrite reddish sandstone, and shell fragments.
8940	8950	Missing samples.
8950	9000	Limestone--dark gray, micro-sugary, partly very light brown; some gray shale; small amounts of reddish shale and sandstone, greenish shale, white anhydrite.
9000	9020	Dolomite--dark gray and light olive gray, limy, dense; some dark gray to brownish, micro-sugary, dolomitic limestone.
9020	9050	Limestone--dark gray, light olive gray to brownish, micro-sugary to dense, partly dolomitic; small amounts of reddish sandstone and dark gray shale.
9050	9110	Limestone--light olive gray, dolomitic, micro-sugary, becoming darker and less dolomitic; some light gray, chalky limestone; traces of dark gray shale and reddish siltstone.
9110	9150	Limestone--medium dark gray, micro-sugary; some very pale yellow brown, chalky limestone; small amounts of dark gray shale and reddish siltstone.
9150	9160	Missing samples.
9160	9170	Limestone--medium dark gray and olive brown; micro-sugary, partly very light gray, sublithographic.
9170	9180	Missing samples.
9180	9200	Limestone--medium dark gray, micro-sugary; small amounts of light gray dense dolomite and very pale brown dense limestone; small amounts of gray and reddish shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
9200	9240	Limestone--medium gray, dense, partly chalky, partly olive gray and light gray; some sublithographic pale dolomite (9210-9230) increasing amounts of silty, reddish shale.
9240	9260	Limestone--medium gray, micro-sugary to chalky; some light gray, chalky limestone.
9260	9290	Limestone--medium gray, slightly greenish, dense; small amounts of reddish and gray shales and siltstone; shell impressions.
9290	9330	Limestone--very light brown, chalky; much fine to micro-sugary, yellow gray, somewhat brownish, partly chalky limestone; small amounts of reddish and dark gray shale.
9330	9340	Limestone--dark gray to olive gray, micro-sugary to fine sugary, partly chalky; some black and reddish shale; shell impressions (brachiopods).
9340	9390	Limestone--greenish gray, partly brownish, fine sugary, partly chalky, becoming sublithographic; small amounts of dark gray, reddish, and greenish shales; scattered traces of white anhydrite and reddish siltstone; missing samples: 9350-9360.
9390	9430	Limestone--light gray sublithographic to greenish gray (slightly brown) micro-sugary; much dark gray, brownish, reddish and silty green shale, decreasing greatly in quantity beginning at 7410; traces of dense white anhydrite.
9430	9480	Dolomitic limestone--gray brownish, somewhat olive, very fine sugary partly chalky; some very light brown chalky limestone; traces of dark gray greenish, and reddish shales; missing samples: 9440-9450, 9480-9490.
9490	9540	Limestone--dark, fine sugary as above; traces of dark gray, silty red, calcareous green, and dusky yellow, and light brown shale, increasing somewhat in quantity at 9530.
9540	9560	Limestone--dark, fine sugary, as above; some very light brown, chalky limestone; small amounts of greenish, reddish, dark gray shale.
9560	9570	Limestone--medium dark gray, fine sugary, partly chalky slightly dolomitic; some very light brown, limy shale, small amounts of variegated shale as above.
9570	9580	Limy dolomite--olive brown and gray, dense, partly chalky; some grayed brown, fine sugary, dolomitic limestone; some chalky limestone as above; small amountsof variegated shale.
9580	9640	Dolomite limestone--grayed brown (partly olive), dense, partly chalky; much chalky limestone as above; small amounts of dark gray, black, reddish, and greenish shale, increasing in quantity beginning at 9610.
9640	9670	Dolomitic limestone as above; much reddish, lumpy and silty shale small amounts of gray and green shale and white anhydrite; the reddish shale almost ends at 9650.
9670	9730	Limestone--dark gray, partly brown and green tinged, dense, partly chalky; some chalky limestone as above, increasing at 9710; small amounts of white anhydrite, red and gray shales.
9730	9770	Shale--grayish black, carbonaceous; traces of reddish shale, chalky limestone, and white anhydrite; some limy, yellow gray, fine grained sandstone (9760-9770).

<u>From</u>	<u>To</u>	<u>Formation</u>
9770	9790	Sandstone--light olive gray, fine grained, limy; some dark gray and reddish shale.
9790	9800	Sandstone--very light brown; fine grained, limy; small amounts of shale and dense limestone as above.
9800	9810	Missing samples.
9810	9864	Shale--dark gray to gray black; traces of reddish siltstone, pyrite; missing samples: 9850-9860.
9864	9880	Limestone--pale green, chalky; some grayish orange pink, fine sugary to chalky, dolomitic limestone; small amounts of reddish and gray shales.
9880	9920	Limestone--almost white, chalky to sublithographic; some sublithographic, pale yellow gray dolomite; small amounts of greenish, grayish and reddish shale.
9920	9970	Limestone--pale green to very pale brown, shaly, sublithographic to chalky; some variegated shale, especially calcareous reddish shale.
9970	9980	Very calcareous shale--reddish, pale green; small amounts of dense limestone and dark gray shale.
9980	9990	Limestone--varigated pastel colors, dense; much chalky, shaly limestone, small amounts of reddish and gray shales.
9990	10,040	Shaly limestone--reddish and greenish, chalky to lithographic; small amounts of reddish shale and dense gray limestone.
10,040	10,050	Limestone--pinkish and greenish gray, shaly, chalky; some dense gray limestone; red, green, and gray shale in small amounts.
10,050	10,060	Dolomite--very light gray, fine sugary; much dark gray, fine sugary limestone; small amounts of chalky limestone and shale as above.
10,060	10,090	Limestone--dark gray, somewhat brownish, fine sugary; increasing amounts of off-white, chalky to sub-lithographic limestone; small amounts of shale.
10,090	10,130	Limestone--moderate gray to light olive gray, fine sugary; much chalky, very light gray limestone; some silty light brown, somewhat calcareous, shale.
10,130	10,150	Limestone--light olive gray, yellow gray, fine to micro-sugary; much light gray, shaly sublithographic to chalky limestone; some sugary, almost white limestone (10,140-10,150).
10,150	10,200	Limestone--light olive gray, slightly brown, fine sugary; much almost white chalky to sublithographic limestone; some fine sugary white dolomite, increasing in quantity at 10,190; small amounts of light brown siltstone and dark gray shale and white anhydrite.
10,200	10,220	Limestone-- yellow gray, somewhat brownish, fine sugary; much chalky white limestone; some pale blue, dense dolomite, increasing greatly in quantity at 10,210; small amounts of reddish silty shale, dark gray shale, and white anhydrite.
10,220	10,240	Limestone--light yellow brown, sugary; some chalky white limestone and darker, dense limestone; small amounts of shale as above.

<u>From</u>	<u>To</u>	<u>Formation</u>
10,240	10,300	Limestone--pale yellow brown, micro-sugary; much almost white, chalky limestone; some moderate gray, fine sugary limestone beginning at 10,260; small amounts of shale; missing samples: 10,270-10,280, 10,290-10,300.
10,300	10,390	Limestone--yellow brown, sugary, partly sandy; much chalky, almost white limestone; some moderate gray, dense limestone; small amounts of dense bluish dolomite and dark gray shale; increasing, small amounts of silty, reddish shale; missing samples 10,320-10,340.

Cored interval: 10,390-10,417

10,390	10,404½	Limestone--brownish gray, becoming light brownish gray (specked with yellow gray and pinkish gray), fine sugary.
10,405½	10,409	Dolomite--medium gray with yellow brown specks, micro-sugary; some medium dark gray shale.
10,409	10,417	Dolomite--light brownish gray with pinkish gray specks, micro-sugary.
10,417	10,430	Missing samples.

Cored interval: 10,417-10,430

10,430	10,432½	Dolomite--brownish olive gray with pinkish gray specks, micro-sugary.
10,434½	10,437	Dolomite--light brownish gray, somewhat limy, micro-sugary; some dense, yellow gray, slightly brownish dolomite.
10437	10,439	Limestone--light brownish gray with pinkish specks, micro-sugary.
10,439	10,455	Missing samples.
10,455	10,460	Limestone--dark, dense; some very light brown; chalky limestone; much olive brown and silty red shale; some medium grained light brown sandstone.
10,460	10,478	Limestone--light brownish gray, slightly yellow, fine sugary, sandy; some dense; gray limestone and chalky white limestone; some silty reddish shale.
10,478	10,485	Limestone--moderate gray and brown, micro-sugary; some silty reddish shale and very light brown sandstone.
10,485	10,491	Limestone--pale yellow brown, fine sugary, somewhat sandy; some dense dark limestone and light chalky limestone; some greenish, grayish, and silty reddish shale.
10,491	10,500	Limestone--pale yellow brown, sugary, sandy; some chalky white limestone and small amounts of dense dark limestone; much variegated shale (gray, green, red, purple).
10,500	10,535	Limestone--olive gray and light brownish gray, dense; some limestone as above and some pale dense dolomite; small amounts of gray and lumpy reddish shale, increasing greatly in quantity (10,522-10,525); much chalky white limestone (10,525-10,530).
10,535	10,550	Limestone--moderate gray and brown, dense; some sandy limestone as above; much silty reddish and dark gray shale; some light brownish gray, somewhat yellow dense dolomite, becoming pale yellow brown and sugary.

<u>From</u>	<u>To</u>	<u>Formation</u>
10,550	10,565	Limestone--as above; much light brownish gray, slightly yellow and pink, fine sugary dolomite; some reddish siltstone.
10,565	10,570	Missing samples.
10,570	10,620	Limestone--moderate dark gray and brown, micro-sugary; some chalky, almost white limestone; some pale yellow brown, fine sugary limy dolomite, ending at 10,600; small amounts of gray shale, reddish shale and siltstone, white anhydrite.
10,620	10,630	Missing samples.
10,630	10,660	Limestone--moderate brownish gray, dense; some chalky limestone, increasing in quantity at 10,650; some dense blue gray dolomite and sugary yellow brown limy dolomite; small amounts of shale and siltstone as above.
10,660	10,670	Missing samples.
10,670	10,680	Limestone--light brownish gray, micro-sugary; some sandy limestone as above, much shale and siltstone as above.
10,680	10,700	Limestone--dark gray and brown, dense; some chalky white limestone; decreasing amounts of dense, brownish gray, limy dolomite; increasing amounts of dark gray shale; a small amount of reddish shale.
10,700	10,760	Limestone--moderate gray and brown, dense; some chalky white limestone; some pale blue gray to light gray, dense dolomite, becoming rather limy at 10,730; small amounts of reddish, purplish, gray, greenish shales; missing samples: 10,740-10,750, 10,760-10,780.
10,780	10,790	Limestone---as above; much light brown, sugary, limy dolomite; some variegated shale as above.
10,790	10,810	Missing samples.
10,810	10,880	Limestone--moderate a dark gray and brown, micro-sugary; small amounts of chalky limestone; much light yellow gray very fine sugary limestone, beginning at 10,840; some light brown sugary dolomite; small amounts of variegated shales, becoming mostly gray and reddish; missing samples: 10,860-10,870.
10,880	10,900	Limestone--as above, increasing amounts of moderate gray and brown, sugary, limy dolomite; some reddish shale and siltstone and grayish shale.
10,900	10,910	Limestone--gray and brown, dense; much shaly, dense, light brownish gray limestone; some light gray, chalky limestone and dense white anhydrite; some shale and siltstone as above.
Cored Interval: 10,912-10,942		
10,912	10,935	Dolomite--light to dark brownish gray, fine sugary; much white anhydrite.
10,935	10,942	Limestone--light to dark brownish gray, fine sugary.
10,942	10,960	Limestone--moderate gray and brown, dense; some fine sugary to sublithographic, slightly sandy limestone; small amounts of dark gray and reddish shale and white anhydrite.
10,960	10,980	Missing samples.

<u>From</u>	<u>To</u>	<u>Formation</u>
10,980	11,040	Limestone--moderate gray and brown, dense; some reddish siltstone and shale; increasing amounts of yellow gray, vuggy, limy, sugary dolomite; small amounts of white anhydrite, grayish and greenish shale; missing samples; 11,010-11,020.
11,040	11,050	Limestone--light brown and gray, micro-sugary; some light brown, chalky limestone; much yellow brown, micro-sugary; limy dolomite; some dark gray shale and reddish siltstone.
11,050	11,130	Missing samples.
11,130	11,150	Limestone--moderate dark, dense; much sugary, yellow brown limy dolomite; some white dolomite and anhydrite; much dark gray shale; small amounts of reddish siltstone.
11,150	11,210	Limestone--moderate dark, micro-sugary; some sugary, pale yellow brown limestone; much white to light gray, dolomite and anhydrite; some dark gray shale, reddish siltstone and traces of reddish greenish and brownish shale, increasing at 11,190.
11,210	11,230	Limestone--moderate dark, micro-sugary to dense; much white to very light brown, chalky limestone; small amounts of gray and reddish shale.
11,230	11,260	Missing samples.
11,260	11,300	Limestone--as above, some white anhydrite and limestone; some shales.
11,300	11,320	Missing samples.
11,320	11,410	Limestone--moderately dark gray, micro-sugary; some yellow brown, sugary limestone; some dense, very pale yellow brown, dolomitic limestone; some almost white dolomite and limestone; some dark gray shale and reddish siltstone; traces of anhydrite, greenish shale; missing samples: 11,350-11,370, 11,400-11,410.
11,410	11,570	Limestone--moderate dark gray and brown, micro-sugary; much light gray and brown, chalky limestone; much reddish siltstone and shale, greenish shale, and dark gray shale; traces of shell impressions (brachiopods); scattered small amounts of white anhydrite; missing samples: 11,440-1,450; 11,550-11,560.
11,570	11,580	Limestone--as above, much fine sugary, very light brown to almost white dolomite, some yellow brown, sugary, limy dolomite, traces of reddish shales.
11,580	11,603	Missing samples.
Cored intervals: 11,603-11,643, 11,663-11,750, 11,795-11,802.		
11,603	11,620	Limy dolomite--medium brownish gray, micro-sugary.
11,620	11,627	Limy dolomite to dolomitic limestone--medium brownish gray micro-sugary.
11,627.7	11,636	Anhydrite--white to very light gray, somewhat yellowish in parts, dense.
11,636	11,643	Limestone--moderate orange pink, dense, shaly; some grayed red, hard, dense shaly limestone.
11,663	11,665	Limestone--white, sugary to micro-sugary; some limestone is light gray and brown.

<u>From</u>	<u>To</u>	<u>Formation</u>
11,665	11,670	Dolomitic limestone--light brownish gray, micro-sugary.
11,670	11,675	Limestone--white, sublithographic with included crystals.
11,675	11,687	Limestone--medium light gray and brown, fine sugary, partly oolitic; some light brownish gray, micro-sugary, finely vuggy dolomite.
11,693	11,696	Dolomite--pinkish gray, micro-sugary, very hard.
11,695	11,701.8	Dolomite--pale red, micro-sugary, vary hard, some is light gray.
11,702.8	11,703.7	Dolomite--dark gray, micro-sugary, very hard.
11,705.8	11,731	Limestone--light gray, dense; some light brownish gray, shaly, vuggy, dolomite.
11,733	11,750	Dolomite limestone--very light brownish gray, dense; much white; sublithographic, limy dolomite.
11,795.5	11,802	Limestone--very light gray, sublithographic, hard.
11,802	11,837	Missing samples.
11,837	11,865	Limestone--very light brown, micro-sugary, partly lumpy and porous; small amounts of reddish siltstone, gray shale, purplish shale; some dense, pale brown dolomite; 11,860-11,865.
11,865	11,875	Limestone--very light brown, micro-sugary, partly lumpy and porous; some reddish siltstone and dark gray shale; small amounts of reddish shale and dense gray limestone.
11,875	11,900	Limy dolomite--very light gray, micro-sugary, hard; some lumpy, very light brown dolomite; some reddish siltstone and dark gray shale; missing samples: 11,880-11,888.
11,900	11,915	Dolomitic limestone to limy dolomite--very light brown, micro-sugary, becoming mostly dolomite; small amounts of reddish, purplish, brownish, and gray shales and reddish siltstone.
11,915	11,920	Limestone and dolomite as above; small amounts of reddish shale.
11,920	11,960	Limestone--light brown, dense, brittle, argillaceous; scattered small amounts of dense, dark limestone; much lumpy, porous tan and gray limestone beginning at 11,935; small amounts of reddish siltstone; traces of white anhydrite: 11,950-11,960.
11,960	11,995	Dolomite--light brown, dense, brittle, argillaceous becoming rather limy, some dense, dark limestone; some reddish siltstone and dark gray shale.
11,995	12,000	Missing samples.
12,000	12,020	Limy dolomite--vary light brown, micro-sugary; much light brown, dense to lumpy and porous dolomite; much reddish siltstone and dark gray shale.
12,020	12,035	Limy, dolomite--light gray, micro-sugary, partly yellow brown and lumpy, some reddish siltstone and dark gray shale, partly greenish.
12,035	12,060	Limy dolomite as above; plus much almost white, sublithographic dolomite, small amounts of dense; dark limestone; much light brown, porous, lumpy, limy dolomite beginning at 12,050; some siltstone and shale as above.
12,060	12,065	Missing samples.

<u>From</u>	<u>To</u>	<u>Formation</u>
12,065	12,082	Dolomite--white, dense, brittle; some micro-sugary, light gray and brown dolomite; some medium gray and brown limestone; much reddish siltstone and dark gray shale; traces of quartz crystals.
12,082	12,090	Dolomite--as above, less reddish siltstone; small amounts of dark limestone, white anhydrite, dark gray shale.
12,090	12,140	Dolomite--very light brown, sublithographic; some dark limestone as above; some lumpy reddish shale and siltstone and dark gray shale; traces of quartz crystals, dolomite, anhydrite; missing samples: 12,115-12,120; 12,130-12,135.
12,140	12,170	Dolomite--white to light gray and brown, sublithographic much reddish siltstone and shale; some dark gray shale; chalky limestone, white dolomite and anhydrite; traces of quartz crystals.
12,170	12,180	Dolomite, siltstone, and shale as above; plus increasing amounts of pale reddish purple, dense dolomite; small amounts of white anhydrite, dolomite, and anhydrite.
12,180	12,230	Dolomite--gray, increasingly reddish purple, dense; much green, dark gray and reddish shale; some reddish siltstone; missing samples: 12,190-12,195; 12,217-12,230.
12,230	12,250	Dolomite--grayish red purple, light brown and gray, dense to sublithographic; much reddish siltstone and lumpy shale; some dark gray and variegated shale.
12,250	12,305	Dolomite--very pale yellow brown sublithographic, small amounts of dark gray shale, purplish dolomite, reddish siltstone and shale; missing samples: 12,280-12,285.
12,305	12,340	Dolomite--almost white, micro-sugary; some reddish siltstone and shale small amounts of dark gray shale, sugary dolomite, dark limestone; missing samples; 12,330-2,335.
12,340	12,395	Dolomite--very light brown and gray, micro-sugary; some reddish siltstone and lumpy shale and dark gray shale; traces of dark limestone, quartz crystals, pyrite, chert.
12,395	12,420	Dolomite--very light brown to light gray, micro-sugary to fine sugary; small amounts of reddish siltstone and dark gray shale, dark limestone.
12,420	12,455	Dolomite--very light brown and gray, slightly yellow in part, very fine sugary; scattered small amounts of quartz crystals, chert, reddish shale and siltstone, dark gray shale, variegated shale (beginning at 12,450).
12,455	12,460	Dolomite--dark gray and brown; some light, very fine sugary, limy dolomite; some dark gray shale and reddish siltstone.
12,460	12,525	Dolomite--light to moderate brown and gray, micro-sugary; some light, sublithographic, limy dolomite; small amounts of dark limestone, shale and siltstone as above, chalky white limestone.
12,525	12,535	Missing samples.
12,535	12,605	Dolomite--light brown to medium brown, partly gray micro-sugary; some reddish siltstone and lumpy shale; small amounts of dark limestone, dark gray shale; scattered traces of greenish shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
12,605	12,625	Dolomite--vary pale yellow brown and gray, micro-sugary; small scattered amounts of dark gray and greenish and reddish shale, white anhydrite, dark limestone, reddish siltstone.
12,625	12,715	Dolomite--very light brown, sublithographic, partly darker brown; some reddish siltstone and dark gray shale; small amounts of dark limestone, increasing greatly in quantity at 12,660; some white anhydrite beginning at 12,675.
12,715	12,764	Dolomite--medium to dark brown and gray, micro-sugary; some hard, limy, shale; some siltstone and shale as above; traces of anhydrite, dolomite, and limestone as above; traces of orangish, round quartz appearing at 12,730 and increasing in quantity at 12,750; missing samples: 12;735-12;750; 12,755-12,764.
12,764	12,790	Dolomite--as above; siltstone and shale as above; some dense, dark limestone scattered traces of pyrite, anhydrite, greenish shale.
12,790	12,795	Limestone--dark gray and brown, dense; some dolomite as above; some light brown, dense, dolomitic limestone; shale and siltstone as above.
12,800	12,805	Siltstone and shale--reddish and dark gray; much white dolomite; small amounts of anhydrite and green gray shale.
12,805	12,865	Dolomite--dark gray and brown, micro-sugary; some light, sublithographic dolomite; some dark limestone, dark gray shale, reddish siltstone; more dark gray shale beginning at 12,835; small scattered amounts of reddish shale, pyrite.
12,865	12,870	Missing samples.
12,870	12,890	Dolomite--dark gray and brown, micro-sugary, partly light brown; small amounts of gray, red and yellow orange shale, white anhydrite, pyrite.
12,890	12,905	Dolomite--dark gray and brown, sublithographic; some light brown, dense, limy dolomite; some reddish siltstone and shale; gray shale, white dolomite and anhydrite.
12,905	12,910	Missing samples.
12,910	12,920	Dolomite--dark gray and brown, micro-sugary; some almost white, dense dolomite; some reddish brown siltstone; small amounts of dark gray shale and white anhydrite.
12,920	12,935	Dolomite--dark, as above; much reddish siltstone; some dark gray shale; scattered small amounts of chert, anhydrite.
12,935	12,940	Missing samples.
12,940	12,960	Dolomite--as above; some dense; white dolomite; some reddish siltstone and dark gray shale; missing samples: 12,945-12,950.
12,960	12,965	Missing samples.
12,965	12,985	Dolomite--medium to dark gray and/or brown; micro-sugary; some white anhydrite, dark gray shale, reddish siltstone.
12,985	12,990	Missing samples.
12,990	13,010	Dolomite--dark as above, small amounts of reddish and light brown siltstone and dark gray shale, increasing greatly in quantity at 12,998; traces of anhydrite and greenish shale and dark limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
13,010	13,025	Dolomite as above; some shale and siltstone as above; traces of anhydrite and dark limestone; missing samples: 13,015-13,020.
13,025	13,055	Dolomite as above; some medium to dark, dense, limestone; some reddish siltstone, dark gray shale, white anhydrite; missing samples: 13,045-13,050.
13,055	13,075	Dolomite--moderately dark gray and brown, sub-lithographic; some reddish siltstone, dark gray shale, light brown dolomite, dark limestone, and white anhydrite; more limestone beginning at 13,070.
13,075	13,130	Limestone--dark, dense; much dark dolomite as above; much chalky, almost white limestone, dolomite, and anhydrite; some dark gray shale and reddish siltstone; traces of brachiopod impressions.
13,130	13,155	Limestone--dark gray and brown, dense; much dark, dense dolomite; some pale yellow brown, micro-sugary dolomite; small amounts of reddish siltstone dark gray shale; some medium brown, micro-sugary dolomite (13,135-13,140); missing samples: 13,140-13,148.
13,155	13,174	Limestone--dark gray and brown, micro-sugary; some light brown dolomite, becoming somewhat darker at 13,170; small amount of reddish siltstone, dark gray shale, yellowish anhydrite, and chalky limestone.
13,178	13,200	Shale--dark gray; small amounts of reddish, purple, yellowish and greenish shales; much pale reddish brown siltstone.
13,200	13,221	Shale and siltstone as above; much medium to dark micro-sugary dolomite; scattered small amounts of dark limestone.
Cored interval: 13,221-13,325		
13,221	13,225	Dolomite to dolomitic limestone--light brownish gray, micro-sugary.
13,225	13,228	Limestone--very pale yellow brown, dark gray, sugary limestone.
13,228	13,231½	Sandstone--very light brown, fine grained, slightly calcareous; some limestone and dolomite as above.
13,233½	13,237½	Dolomite--dark gray and yellow brown, sugary; some sandstone as above.
13,239	13,243	Dolomite--as above; some dark limestone (12,239-12,241).
13,243	13,255	Dolomite--dark gray and yellow brown, fine sugary, slightly limy with included crystals beginning at 13,250.
13,255	13,260	Sandstone as above; much dolomite as above.
13,260	13,273	Dolomite--dark gray, less yellow brown, fine sugary.
13,273	13,275½	Limestone---dark gray and yellow brown, fine sugary; traces of dolomite as above and pyrite.
13,275½	13,276½	Sandstone as above; small amounts of dark dolomite as above.
13,276½	13,292½	Limestone and dolomitic limestone--dark gray and yellow brown, fine sugary.
13,293½	13,307	Limestone--dark gray, sublithographic, with spots of yellow brown.

<u>From</u>	<u>To</u>	<u>Formation</u>
13,307	13 025	Limestone--dark brown and gray, sublithographic, with yellow brown spots.
Total depth.		