NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 213

Summary of the Monsanto Chemical Co., Lion 0il Division - Robert M. Bly #1
Well No. 2132 - Permit No. 2144

by William P. Eastwood
June, 1959

Monsanto Chemical Co. #1 Bly located in Cen. NE 1/4, NW 1/4, sec. 36, T. 163N., R. 92W., Burke County, North Dakota. Elevation of Kelley bushing - 1947 ft; ground level - 1936 ft. Drilling contractors - Cactus Drilling Corporation, San Angelo, Texas.

The well was spudded Dec. 31, 1958 and drilled to a depth of 6,210 ft. It was completed as a producer in the Nesson zone on Jan. 26, 1959.

Drill Stem Tests:

#1 6068-97 - Shut in 60 minutes, open 60 minutes, strong blow for 10 minutes, decreasing to weak in 30 minutes. Received 270 ft. of fluid; 180 ft. slightly gas-cut mud, 90 ft. of very heavily gas-cut mud, slightly oil-cut. FP 130-150#, IP 2900-1360#.

#2 6108-58 - Shut in 30 minutes, open 45 minutes, shut in 60 minutes, gas to surface in 1 1/2 minutes, mud in 37 minutes, oil in 42 minutes estimated 40 barrels oil per hour, 3/4" choke, FP 455-484#, SIP 2775-2749#, HP 3521#.

Perforations:

Perforated 6110-30 with 2 holes per foot. Acidized with 500 gallons mud acid. Shut in 20 minutes, reversed out, kicked off and flowed in 5 minutes; flowed 8 1/2 barrels oil in 1 hour. With 10/64" choke, tubing pressure 1000#, casing pressure 600#; flowed 7 barrels oil for 90 minutes through 13/64" choke, tubing pressure 1050#, casing pressure 600#; flowed 121 barrels oil in 5 1/2 hours through 20/64" choke, tubing pressure 950", casing pressure 475#, flowed at rate of 22 barrels oil per hour on 5 1/2 hour test; shut in tubing pressure 1175#, shut in casing pressure 650#. IPF 326 barrels of oil in 16 hours, 16/64" choke, tubing pressure 1000#, casing pressure 475#, 39.4 API, estimated GOR - 900.

Casing Record:

502 feet of 8 5/8 inch surface casing cemented with 360 sacks.
6,199.5 feet of 5 1/2 inch production casing cemented in with 275 sacks.
6,137 feet of 2 3/8"inch tubing.

Core Record:

1. 6071-97, recovered 26 feet.
2. 6104-31, recovered 27 feet.
3. 6131-58, recovered 27 feet.

Logs Run:

Laterolog-gamma ray, microlaterolog, sonic log, (all Schlumberger).

Formation tops were determined by the samples and mechanical logs. Color names used are those of the National Research Council's Color Chart.

FORMATION TOPS

Cretaceous System	
Pierre fm.	1,125
Greenhorn fm.	3,350
Mowry fm.	3,623
Fall River	3,960
Jurassic System	
Swift Em (?)	4,290
Rierdon fm.	4,655
Piper fm.	4,835
"Piper limestone"	5,020
Triassic (?) System	
Spearfish fm.	5,263
Mississippian System	
Charles fm.	5,624
Midale zone	6,078
Nesson zone	6,110
T.D.	6,210
P.B.	6,173

530-540	Abundant lignite and light gray to greenish gray shale.
540-550	As above.
550-560	As above.
560-570	As above.
570-580	As above, rare very pale orange quartzite pebbles.
580-590	As above.
590-600	Lignite, and greenish gray shale, as above.
600-610	Abundant shale, as above, slightly limy, rare, lignite.
610-620	Abundant lignite with common greenish gray shale.
620-630	Shale as above, very rare lignite.
630-640	Abundant lignite, rare shale as above, rare pink quartzite pebbles, rare moderate yellowish brown siltstone.
640-650	Abundant shale, as above, rare lignite.
650-660	As above.
660-670	As above.
670-680	Avery abundant lignite, rare greenish gray shale.
680-690	As above, rare very light gray fine-grained sandstone.
690-700	Abundant greenish gray shale as above with common pale reddish brown shale.
700-710	Shale, silty as above with rare reddish brown siltstone.
710-720	As above.
720-730	As above, red-brown shale more common than the greenish shale.
730-740	Greenish-gray silty shale, as above.
740-750	As above, common reddish brown silty shale, very rare white chert & black lignite.
750-760	Greenish gray to pale pale olive, silty shale.
760-770	As above.
770-780	As above, slightly sandy.
780-790	Missing.
790-800	As above, stained reddish brown (heated in dryer?)
800-810	Shale as above.
810-820	Shale as above, rare fine grained sandstone, quartz and glauconite (?) grains with white matrix.

820-830	Lignite.
830-840	Lignite.
840-850	Lignite, rare greenish gray shale.
850-860	As above.
860-880	As above.
880-890	Sandstone, medium to coarse grained, subrounded quartz, chert & dark mineral grains, shaly; very rare lignite.
890-910	Missing.
910-920	Sandstone and common lignite as above.
920-930	As above.
930-940	Light gray to white sandstone and greenish gray shale.
940-950	As above, rare lignite.
950-960	Sandstone and shale as above.
960-970	As above with rare pale yellowish brown chert(?).
970-980	Shale and medium to coarse grained sandstone, as above.
980-990	As above.
990-1000	As above, rare dark gray shale.
1000-1010	Missing.
1010-1020	Common pale olive shale, common white sandstone, as above, rare pale yellowish brown chert and black lignite.
1020-1030	Shale, silty, as above, rare lignite.
1030-1040	As above.
1040-1060	As above.
1060-1070	Sandstone, very light gray to white, medium to coarse grained subrounded to rounded quartz grains in a white matrix, friable, rare brown shale and black lignite. Sandstone slightly glauconitic.
1070-1080	Missing.
1080-1090	Abundant sandstone and rare lignite and shale as above.
1090-1100	As above.
1100-1110	Missing.
1110-1120	Very light gray to white, clayey shale, slightly sandy, common lignite and black shale.
1125	Top of Pierre
1120-1130	Sandy shale, rounded to subrounded medium to coarse quartz grains “Floating” in a very light gray to white shale, rare lignite and brown shale.
1130-1140	As above, rare black shale.
1140-1150	Sandy shale as above, rare lignite and brown shale.
1150-1160	As above.
1160-1170	As above with medium gray sandy shale.
1170-1190	As above.
1190-1200	Medium gray finely sandy and silty shale.
1200-1220	As above.
1220-1230	Medium gray and light gray shale.
1230-1240	Light gray to white sandy shale.
1240-1250	Sandy shale as above.
1250-1260	Shale, medium gray, silty, pyritic, rare white shale as above.
1260-1300	Medium gray shale, as above, rare lignite and sandstone cavings.
1300-1350	Shale as above.
1350-1400	As above.
1400-1600	Missing.

1600-1650	Medium gray to medium light gray silty shale, rare greenish gray shale. Rare lignite cavings.
1650-1760	Missing.
1760-1800	Medium gray to dark gray shale. Rare lignite and red brown siltstone cavings.
1800-1850	As above, rare white sandstone and mollusk fragments.
1850-1900	As above.
1900-1950	Medium gray, rarely dark gray, silty, pyritic shale, rare mollusk fragments, rare lignite cavings.
1950-2000	Medium gray silty shale becoming dark gray toward base, rare light gray sandy shale at about 1970-80. Rare mollusk fragments and lignite cavings.
2000-2050	Medium gray and dark gray silty shale, rare mollusk fragments, rare cavings of lignite and white limey, glauconitic sandstone.
2050-2100	Shale, as above.
2100-2160	As above.
2160-2200	As above.
2200-2250	Medium gray and dark gray shale, rare light gray sandstone.
2250-2300	As above, sandy at 2270-80.
2300-2350	AS above.
2350-2400	Medium gray, silty, slightly pyritic shale.
2400-2450	As above.
2450-2470	As above.
2470-2510	Missing.
2510-2550	As above, common light gray silty shale 2510-2530.
2550-2600	Medium gray shale, as above.
2600-2650	Medium gray to dark gray silty and pyritic shale.
2650-2700	As above.
2700-2750	As above with abundant dark gray to grayish black shale at 2710-2740.
2750-2800	Medium gray and dark gray, clayey, micaceous shale.
2500-2850	As above.
2850-2900	As above.
2900-2950	As above with rare white shale.
2950-3000	As above.
3000-3050	As above.
3050-3100	As above.
3100-3140	As above.
3140-3150	Dark gray limy shale with white specks.
3150-3200	As above, with dark gray non-speckled shale and common medium gray shale.
3200-3230	As above.
3230-3240	Abundant medium gray shale, common dark gray, slightly limy shale, rare white limestone.
3240-3250	As above with common speckled shale.
3250-3260	Shale, as above, with rare white limestone.
3260-3270	As above, speckled shale very rare.
3270-3280	As above.
3280-3290	Shale, as above.
3290-3300	Medium gray and dark gray shale.
3300-3350	As above, rare mollusk fragments and white limestone, very rare pyrite.

3350	Top of Greenhorn fm.
3350-3400	As above, rare white sandy limestone at 3380-90.
3400-3430	Abundant medium gray shale, common dark gray shale, rare white limestone and mollusk fragments.
3430-3450	Abundant dark gray shale, common medium gray shale, rare limestone and mollusk fragments.
3450-3460	Shale, as above, rare light gray to white, limy sandstone.
3460-3500	As above.
3500-3510	As above, rare dark yellowish brown limestone.
3510-3550	As above, rare speckled shale.
3550-3600	Shale, as above, rare limestone and sandstone, as above.
3623	Top of Mowry fm.
3600-3650	Dark gray and medium gray shale.
3650-3700	As above.
3700-3750	Dark gray clayey shale and medium gray silty shale.
3750-3800	As above.
3800-3850	As above.
3850-3900	As above, rare light gray, medium-grained sandstone.
3900-3950	Shale and very rare sandstone, as above.
3960	Top of Fall River fm.
3950-4000	As above with very rare pyrite.
4000-4050	Dark gray shale, as above; common medium gray shale as above, and rare sandstone and, pyrite as above.
4050-4100	As above, rare mollusk fragments; rare dark yellowish brown siltstone.
4100-4150	Shale, as above.
4150-4200	Dark gray shale and medium gray silty shale, as above.
4200-4250	As above.
4290	Top of Swift fm.
4250-4300	As above.
4300-4350	As above.
4350-4400	As above, rare quartz grains and mollusk fragments.
4400-4450	Shale as above.
4490-4500	As above.
4500-4550	As above, with rare white medium-grained sandstone.
4550-4600	Shale and rare sandstone, as above. Very rare white sandy limestone.
4600-4650	As above, rare greenish gray fine grained sandstone and shale.
4655	Top of Rierdon fm.
4650-4700	As above.
4700-4750	Shale, dark gray, medium gray, and greenish gray, as above.
4750-4830	Missing.
4835	Top of Piper fm.
4830-4840	Abundant greenish gray clayey and silty shale, common reddish brown shale; rare pink, medium-grained quartz sandstone; rare light gray to white medium-grained quartz sandstone; very rare yellowish brown and violet shale. Very rare black shale.
4840-4870	As above, rare white limestone.
4870-4880	Shale, as above, common white limey sandstone. Rare pale

yellowish-brown limestone.

4880-4890 Shale and sandstone, as above; common pale yellowish-brown glauconitic limestone.

4890-4900 As above, oolitic limestone.

4900-4910 As above.

4910-4920 Greenish gray and black shale, common pale yellowish-brown to white sandy and oolitic limestone, rare greenish gray medium to fine grained sandstone.

4920-4930 Shale and sandstone as above, common pale yellowish-brown limy shale, rare limestone as above.

4930-4940 As above, reddish brown shale.

4940-4950 As above.

4950-4960 Greenish gray shale and sandstone, black shale (cave?) common white limey sandstone, rare limestone as above.

4960-4970 Shale as above, rare sandstone and limestone as above.

4970-4980 As above, rare dark gray sandstone.

4980-4990 Shale as above, common greenish gray micaceous fine-grained sandstone, rare white limy sandstone and white limestone.

4990-5000 Shale, as above, rare limestone and sandstone as above.

5000-5010 As above, common light gray to white sandy limestone.

5010-5020 Medium gray to dark gray shales, rare limestone and sandstone as above.

5020 Top of “Piper limestone”.

5020-5030 As above.

5030-5040 As above.

5040-5050 Shale as above, common white, fine crystalline limestone.

5050-5060 As above with silty greenish gray shale

5060-5070 Abundant limestone as above; common shale as above.

5070-5080 As above.

5080-5090 Abundant shale as above; common white limestone as above.

5090-5100 Shale as above; rare limestone as above.

5100-5110 Shale, as above.

5110-5120 Missing.

5120-5130 Dark gray shale, common reddish brown shale; very rare white limestone.

5133 Circulation sample as above.

5130-5140 Abundant greenish gray shale and dark gray shale; rare reddish brown shale and white limestone.

5140-5150 Shale as above.

5150-5200 As above.

5200-5230 Missing.

5230-5240 Shale, as above; common white gypsum.

5240-5260 Missing.

5263 Top of Spearfish fm.

5260-5270 Shale and gypsum, as above, rare white limestone.

5270-5320 Missing.

5320-5330 Abundant greenish gray and brown clayey shale, common reddish brown fine-grained sandstone; rare white gypsum.

5330-5340 Shale and sandstone, as above; rare greenish-gray sandstone and black shale (cave?)

5340-5350 Abundant reddish brown splintery shale; common greenish gray shale and reddish brown sandstone.

5350-5360	As above.
5360	Circulated sample as above.
5360-5370	Abundant dark gray & greenish gray shales, common reddish brown shale and sandstone.
5370-5400	As above, rare white gypsum and anhydrite, very rare white limestone.
5400-5450	Shales and sandstones, as above, with rare medium gray silty and limy shale.
5450-5500	Variegated shales and reddish brown sandstone as above.
5500-5550	As above, reddish brown whales predominate.
5550-5580	As above, dark gray and medium gray shales predominate.
5580-5590	Shales as above, abundant reddish brown, fine to medium grained poorly sorted sandstone.
5590-5600	Abundant dark gray medium gray and greenish gray shales, common sandstone as above.
5600-5610	As above.
5610-5620	As above, rare dark gray silty and sandy shale.
5624	Top of Charles fm.
5620-5630	As above, rare reddish brown shale and medium gray fine-grained silty sandstone.
5630-5640	Abundant dark gray, medium gray and greenish gray shales, common reddish brown shale and sandstone, very rare brown limy shale and medium gray sandstone.
5640-5650	As above, reddish brown shales and sandstones predominate, common white to pink anhydrite.
5651	Circulation - 1 hour. Abundant dark gray and greenish gray shales, common reddish brown shale and white to pink anhydrite.
5650-5660	As above.
5660-5670	As above with very rare greenish sandstone and pale brown limy shale.
5670-5680	Abundant dark gray and medium gray shale, common reddish brown shale and white to pink anhydrite, rare greenish gray shale.
5680-5690	Abundant light red to moderate pink pseudo-oolitic anhydritic limestone, rare fine crystalline limestone of the same color, common dark gray shale and white anhydrite as above.
5690-5700	Very abundant limestone as above, common dark gray and medium gray shale as above (cavings?).
5700-5710	Common shale as above, common reddish brown very-fine-grained limy sandstone, rare white to pink anhydrite, very rare limestone as above.
5710-5720	As above.
5720-5730	Abundant white to light pink and very pale orange earthy limestone, rare white and pink anhydrite, common dark gray shale (cave?), rare reddish brown shale and sandstone.
5730-5740	As above, rare moderate red limestone.
5740-5750	Abundant white to very pale orange, fine-crystalline limestone, rare white anhydrite, rare black shale cavings.
5750-5760	As above, with rare very pale orange pseudo-oolitic limestone.
5760-5770	Common white to moderate red limy anhydrite, rare limestone as above, rare moderate red limestone, black and medium gray shale cavings.
5770-5780	Abundant dark gray to medium gray shale, common anhydrite as above, very rare limestone as above.

5780-5790	Black and reddish brown shale, common white limy anhydrite.
5797	Circulation - 1 hour. Abundant white limy anhydrite, common very pale orange fine crystalline limestone, common black shale.
5800-5810	Abundant black and medium gray shale, common anhydrite and limestone as above.
5810-5820	As above, rare medium gray fine crystalline limestone.
5820-5830	Black shale and white anhydrite as above; rare grayish purple limestone.
5830-5840	Missing.
5840-5850	As above.
5850-5860	Black and medium gray shale (cavings?) rare limestone and anhydrite as above.
5860-5870	Black and medium gray sandy shale, rare reddish brown shale, very rare white anhydrite.
5870-5880	As above, badly caved.
5880-5890	As above.
5893	Circulated sample as above.
5890-5900	Common medium gray fine crystalline, very pale orange pseudo-oolitic anhydritic limestone; common white anhydrite, common reddish-brown shale and black shale.
5900-5910	Pale yellowish brown, fine-crystalline to coarsely crystalline and pseudo-oolitic limestone, rare white anhydrite, common black and medium gray shale cavings.
5910-5920	As above.
5920-5930	Very abundant black and medium gray shale, rare white anhydrite.
5930-5940	Shale, as above.
5940-5950	Shale and anhydrite, as above; very rare pale yellowish brown fine crystalline limestone.
5950-5960	Shale and rare anhydrite as above.
5960-5970	As above.
5970-5980	As above.
5980-5990	As above.
5990-6000	As above, rare medium gray sandy shale.
6000-6005	Pale yellowish brown medium crystalline limestone, slightly anhydritic. Cavings as above.
6005-6010	Abundant moderate yellowish brown fine crystalline to finely granular limestone.
6010-6013	Limestone as above, badly caved.
6013	Circulation - 1 hour. As above.
6010-6015	Medium gray and dark gray shale, rare white anhydrite.
6015-6020	As above, with rare yellowish brown finely granular limestone.
6020-6025	As above.
6025-6030	As above.
6030-6035	As above with dark blue-gray anhydrite.
6035-6040	Shale as above, white and bluish gray anhydrite as above.
6040-6045	As above, abundant anhydrite.
6045-6050	Abundant moderate yellowish brown fine-crystalline limestone, common bluish gray anhydrite as above, shale cavings as above.
6050-6055	Anhydrite and shale as above, rare limestone as above.
6055-6060	As above with rare pale yellowish brown anhydrite.
6060-6065	Shale and abundant anhydrite as above.
6065-6070	As above, very rare pale yellowish brown limestone.
6071	Circulation - 1 hour. Shale cavings.

Core #1

6070-6071	Limestone, very light gray, finely granular, brach shells, good porosity, weak fluorescence.
6071-6072	Dolomite, pale yellowish brown, fine crystalline, dense, anhydritic.
6072-6073	Dolomite, limy, pale yellowish brown, medium crystalline, anhydritic, tight.
6073-6074	Limestone, pale yellowish brown, finely granular, good porosity, good cut and fluorescence.
6074-6075	Anhydrite, dark gray, shaly and limy, dense.
6075-6076	Limestone, pale yellowish brown, anhydritic, finely granular, good porosity fair cut and fluorescence.
6076-6077	As above, good cut and fluorescence.
6077-6078	As above, silty, good cut and fluorescence.
6078	Top of Midale zone
6078-6079	As above.
6079-6080	As above, fair cut and fluorescence.
6080-6081	Limestone, as above, weak cut and fluorescence, with pale yellowish-brown medium crystalline to finely granular limestone, good porosity, very weak fluorescence.
6081-6082	Limestone, pale yellowish brown, finely granular, good porosity, weak fluorescence.
6082-6083	As above, dead oil stain, very weak fluorescence.
6083-6084	Limestone, finely granular, good porosity, stained, fair fluorescence.
6084-6085	Limestone, pale yellowish brown, finely granular, comminuted fossil material, fair porosity, weak fluorescence.
6085-6086	Limestone, as above.
6086-6087	Limestone, pale yellowish brown, pelletoid and fossiliferous, low porosity weak fluorescence.
6087-6088	Limestone, as above and finely granular, fair porosity, good cut and fluorescence.
6088-6089	Limestone, finely granular, as above, good fluorescence, dark yellowish brown calcite crystals.
6089-6090	As above, good cut.
6090-6091	Missing.
6091-6092	As above, black carbonaceous material concentrated along a styolite.
6092-6093	Limestone, as above, good fluorescence.
6093-6094	Limestone, as above, very weak fluorescence.
6094-6095	Limestone, pale yellowish brown, pelletoid and finely granular, fair porosity, no fluorescence.
6095-6096	Limestone, pale yellowish brown, pale yellowish brown, finely granular, comminuted fossil material, algal (?), low porosity, no fluorescence.
6096-6097	Limestone, pale yellowish brown, pelletoid, low porosity, no fluorescence.
5097-6098	Limestone, pale yellowish brown, finely granular, fair porosity, very weak fluorescence.
6098-6104	Missing.
6104-6105	Limestone, pale yellowish brown, finely granular and pelletoid, fair porosity, very weak fluorescence.

6105-6106 Limestone, pale yellowish brown, pseudo-oolitic and finely granular, common small open vugs, good porosity, stained, excellent cut and fluorescence.
6106-6107 As above, dark yellowish brown ooids in matrix of pale yellowish brown finely granular and fine crystalline matrix, carbonaceous material along small styolite, good porosity, good fluorescence and cut.
6107-6108 Limestone, pseudo-oolitic as above, weak fluorescence. Clear anhydrite (?) crystals.
6108-6109 Limestone, as above, pseudo-oolitic, anhydritic, low porosity, very weak fluorescence.
6109-6110 Limestone, as above, weak fluorescence.

6110 Top of Nesson zone
6110-6111 As above, no anhydrite, good cut and fluorescence.
6111-6112 Oolitic limestone as above, with white anhydrite in some inter-granular pores, fair cut and fluorescence.
6112-6113 Limestone, as above, anhydrite inclusions, poor intergranular porosity, fair fluorescence.
6113-6114 As above.
6114-6115 Limestone, pale yellowish brown, finely granular and pelletoid, low porosity, weak fluorescence.
6115-6116 Limestone, oolitic, anhydritic, fair intergranular porosity, fair fluorescence.
6116-6117 As above.
6117-6118 As above, oolitic and pelletoid.
6118-6119 Oolitic and anhydritic limestone as above, common intergranular pores, much staining, good cut and fluorescence.
6119-6120 Limestone, oolitic and anhydritic, as above.
6120-6121 As above, pelletoid.
6121-6122 Limestone, pale yellowish brown, finely granular to medium crystalline, low porosity, good cut and fluorescence.
6122-6123 As above, slightly pelletoid, anhydritic, fair fluorescence.
6123-6124 Limestone, oolitic and pelletoid, much intergranular pore space, much staining, good cut and fluorescence.
6124-6125 Limestone, as above, much of the pore space filled with calcite and/or anhydrite, no staining, low porosity, very weak fluorescence.
6125-6126 Limestone, pale yellowish brown, fine crystalline and oolitic, oil stain in intergranular pores, good cut and fluorescence.
6126-6127 Limestone, as above, intergranular pores filled with calcite and/or anhydrite, slight porosity, no staining, weak cut and fluorescence.
6127-6128 As above.
6128-6129 As above.
6129-6130 As above, slight staining, fluorescence and cut as above.
6130-6131 Limestone, as above, oolitic and pelletoid.
6131-6132 As above with many open intergranular pores, good cut and fluorescence.
6132-6133 Limestone, slightly porous, as above.
6133-6134 Limestone, moderate yellowish brown, fine to medium crystalline, slightly pelletoid, pale yellowish brown anhydrite crystals in fractures, low porosity, weak fluorescence.

6134-6135 Limestone, moderate yellowish brown, oolitic on anhydritic, fair porosity, slight stain, fair cut and fluorescence.
6135-6136 Limestone, as above with a great amount of anhydrite, large vugs lined with anhydrite crystals, very weak fluorescence.
6136-6137 Limestone, pseudo-oolitic and pelletoid, rare intergranular pores, low porosity, fair cut and fluorescence.
6137-6138 As above.
6138-6139 Limestone, pale yellowish brown, medium crystalline and pelletoid, common brownish anhydrite (?) crystals. Weak cut.
6139-6140 As above with much white anhydrite, low porosity, fair cut and fluorescence.
6140-6141 As above, slight oil stain.
6141-6142 Limestone, pale yellowish brown, finely granular, good porosity weak cut and fluorescence.
6142-6143 Limestone, pale yellowish brown, medium crystalline with patches of very light gray fine crystalline limestone and with common colorless calcite and/or anhydrite crystals, low porosity, no staining, the light gray limestone seems to be replacing the yellowish brown part. No cut.
6143-6144 Limestone, moderate yellowish brown, fine crystalline-fragmental, slight staining in the matrix between the fragments, low porosity, no cut.
6144-6145 Limestone, moderate yellowish brown, fine crystalline, low porosity no stain, no cut.
6145-6146 Limestone, dolomitic, pale yellowish brown, fine crystalline, low porosity, no cut.
6146-6147 As above.
6147-6148 Limestone, very light gray, finely granular, good to fair porosity, no cut.
6148-6149 Limestone, very light gray, finely granular to finely pelletoid.
6149-6150 Limestone, pale yellowish brown, finely granular, good porosity, very weak fluorescence.
6150-6151 As above.
6151-6152 As above, weak cut.
6152-6153 Limestone, pale yellowish brown, finely granular and pelletoid, fair porosity, very weak cut.
6153-6154 As above, dark brown pellets and small pellet fragments in pale yellowish brown granular matrix.
6154-6155 Limestone, light gray, medium crystalline, slight porosity.
6155-6156 Limestone, yellowish brown, pelletoid, low porosity.
6156-6157 Limestone, moderate yellowish brown; fine crystalline to sub-lithographic, slight stain, low porosity.
6157-6158 As above.
6158-6359 Circulation - 1/2 hour. Abundant moderate yellowish brown sub-lithographic limestone, common black shale cavings.
6159-6165 Common very light gray finely granular limestone and pale yellowish brown pelletoid limestone.
6165-6170 As above with yellowish brown pelletoid limestone more common.
6170-6175 As above.
6175-6180 As above with rare very pale orange to white fine crystalline limestone.
6180-6185 Abundant moderate yellowish brown fine crystalline limestone, common very light gray finely granular dolomitic limestone.
6185-6190 As above.

6190-6195	As above with rare yellowish brown pelletoid limestone.
6195-6200	Abundant pale yellowish brown pelletoid limestone slightly oil-stained with common moderate yellowish brown sublithographic limestone and rare yellowish brown finely granular limestone.
6200-6205	Abundant pale yellowish brown pelletoid limestone, black shale cavings.
6205-6210	As above.
6210	Total Depth.