LITHOLOGIC LOG

Well Name: GPIWA
Well Number: IW-1
Project Number: 01-04409.HO

NE SE Sec.33-T44SR22E
Lee County, FL

Depth Interval (feet bpl)	Thickness (feet)	Sample Description
0-5	5	Sand, pale yellowish brown (10YR 6/2), fine grained, quartz, fair intergranular porosity and apparent permeability.
5-15	10	Sand, yellowish gray (5Y 8/1), very fine to fine quartz, moderately sorted, rounded, with abundant organic matter (vegetative debris).
15-28	13	Shell, yellowish gray (5Y 8/1), whole and fragments of predominantly bivalves, fair to good porosity and apparent permeability, with interbedded Clay, pale olive (10Y 6/2), soft, silty, fine quartz sandy, trace of organic matter.
28-44	16	Same as above, but with increasing clay.
44-50	6	Shell, yellowish gray (5Y 8/1) and light gray (N7), whole and fragments of predominantly bivalves, w/ common clay as above, good to excellent porosity and apparent permeability.
50-128	78	Clay, pale olive (10Y 6/2) to light olive gray 5Y 5/2), soft, silty, cohesive, fine quartz sandy, w/ abundant shell as above.
128-166	38	Sand and Sandstone, greenish gray (5GY 6/1) to dark yellowish brown (10YR 4/2), very fine grained, very silty, quartz, phosphatic, minor shell fragments, sandstone has calcite cement, some phosphate granules, trace to poor porosity and apparent permeability; with interbedded Clay, grayish olive (10Y 4/2), soft, silty, cohesive.
166-215	49	Clay, medium gray (N5), soft, gritty, cohesive, abundant fine to medium grained phosphate, common fine quartz sand, rare shell.
215-223	8	Limestone, yellowish gray (5Y 8/1), micritic, poorly indurated, sandy, finely phosphatic, poor porosity and apparent permeability.
223-249	26	Clay, light olive gray (5Y 6/1), soft, gritty, silty, cohesive, phosphatic, occasional fine-grained quartz sand.
249-269	20	Limestone, yellowish gray (5Y 8/1), micritic, poorly indurated, finely phosphatic, rare shell fragments, poor porosity and apparent permeability.
269-282	5	Clay, pale olive gray (5Y 5/2) to medium gray (N5), soft, silty, occasional fine-grained quartz sand, common fine-grained phosphate.
282-295	21	Limestone, yellowish gray (5Y 8/1), biomicrite, poorly indurated, finely phosphatic, poor porosity and apparent permeability.
295-304	9	Clay, pale olive gray (5Y 5/2), soft, silty, common very fine quartz sand, common fine-grained phosphate.
304-372	68	Limestone, yellowish gray (5Y 7/2), biomicrite, moderately indurated, some fine to medium-grained, subrounded quartz sand, minor fine-grained phosphate, poor porosity and apparent permeability.
372-398	26	Marl, pale greenish yellow (10Y 8/2), soft, sticky, common fine phosphate, some interbedded Limestone, yellowish gray (5Y 8/1), argillaceous, micritic, phosphatic, poorly to moderately indurated, poor porosity and apparent permeability.
398-423	25	Clay, pale olive (10Y 6/2), soft, sticky, finely phosphatic, marly, with some shell fragments.
423-462	39	Marl, yellowish gray (5Y 7/2), soft, sticky, common shell (bivalves and bryozoans), minor fine phosphatic sand, some interbedded Limestone, yellowish gray (5Y 7/2), argillaceous, micritic, moderately indurated, poor porosity and apparent permeability.
462-482	20	Limestone, yellowish gray (5Y 7/2), micritic, poorly indurated, finely phosphatic, poor porosity and apparent permeability.
482-514	32	Marl, pale olive (10Y 6/2), soft, fine quartz sandy, finely phosphatic, some interbedded argillaceous limestone as above.
514-519	5	Limestone, yellowish gray (5Y 7/2), biosparite, moderately indurated, finely phosphatic, poor porosity and apparent permeability. Note: Minor lost circulation within this interval.
519-528	9	Clay, light olive (5Y 5/2) to pale olive (10Y 6/2), soft to firm, sticky, silty, phosphatic (fine to coarse-grained), common bivalve shells and coral fragments, variably marly, minor lime mud, some bedded phosphate.

LITHOLOGIC LOG

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528-531	3	Limestone, light gray (N7), biomicritic to biosparitic, phosphatic, poor porosity and apparent permeability, possible minor lost circulation.
531-558	27	Clay, as above.
558-588	30	Limestone, yellowish gray (5Y 7/2), micritic to finely calcarenitic, poorly indurated, sparsely finely phosphatic, good to fair interparticle porosity, fair apparent permeability, occasional interbedded marl.
588-593	5	Marl, yellowish gray (5Y 7/2), soft, sticky, common shell, including oysters and barnacles.
593-605	12	Limestone, as above, with some interbedded marl, as above.
605-610	5	Dolomite, light olive gray (5Y 5/2), dolomicrite, trace fine phosphatic sand, poor to fair intercrystalline porosity and apparent permeability.
610-638	28	Limestone, yellowish gray (5Y 8/1), biomicritic, highly fossiliferous including bivalves, gastropods and bryozoans, excellent moldic porosity and apparent permeability.
638-654	16	Limestone, yellowish gray (5Y 8/1), biomicritic, phosphatic, good moldic porosity and apparent permeability.
654-666	12	Limestone, yellowish gray (5Y 8/1), biomicritic, phosphatic, slightly dolomitic, highly fossiliferous including abundant gastropods, bivalves, and forams. fair to good moldic porosity and apparent permeability.
666-717	51	Limestone, light gray (N7), biomicritic, phosphatic, highly fossiliferous including abundant gastropods, bivalves and orbitoid forams, good moldic porosity and apparent permeability.
717-751	34	Clay, very light gray (N8), dense, cohesive.
751-784	33	Limestone, yellowish gray (5Y 8/1), calcarenitic to biomicritic, abundant gastropods, bivalves and forams, fair moldic porosity and apparent permeability.
784-811	27	Limestone, very pale orange (10YR 8/2), biomicritic, minor dolomite, fair to good intergranular and moldic porosity and apparent permeability.
811-824	13	Limestone, very pale orange (10YR 8/2), calcarenitic to biomicritic, fair to good intergranular porosity and apparent permeability.
824-838	14	Limestone, yellowish gray (5Y 8/1), calcarenitic, minor dolomite, fair intergranular porosity and apparent permeability.
838-852	14	Clay, very light gray (N8), marly, cohesive, minor interbedded dolomite.
852-862	10	Limestone, very pale orange (10YR 8/2), calcarenitic, some dolomite, fair to good intergranular porosity and apparent permeability.
862-874	12	Limestone, very pale orange (10YR 8/2), calcarenitic, some biomicrite, good intergranular porosity and apparent permeability.
874-888	14	Clay, yellowish gray (5Y 8/1), cohesive.
888-902	14	Limestone, very pale orange (10YR 8/2), calcarenitic, minor dolomite, good intergranular porosity and apparent permeability.
902-935	33	Limestone, very pale orange (10YR 8/2), biomicritic to calcarenitic, fair to good intergranular porosity and apparent permeability.
935-1023	88	Limestone, very pale orange (10YR 8/2), calcarenitic, sandy, minor dolomite, common forams, fair to good intergranular porosity and apparent permeability.
1023-1052	29	Limestone, pale yellowish brown (10YR 6/2), calcarenitic to biomicritic, common forams fair to good intergranular porosity and apparent permeability.
1052-1058	6	Marl, pale yellowish brown (10YR 6/2), some interbedded Limestone, biomicritic.
1058-1071	13	Limestone, pale yellowish brown (10YR 6/2), biomicritic, marly, fair to good intergranular porosity and apparent permeability.
1071-1096	25	Limestone, yellowish gray (5Y 8/1), biomicritic to calcarenitic, trace interbedded clay, grayish brown (5YR 3/2), silty, fair porosity and apparent permeability.
1096-1101	5	Limestone, yellowish gray (5Y 7/2), calcarenitic, hard, good porosity, good apparent permeability.

LITHOLOGIC LOG

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1101-1104	3	Limestone, yellowish gray (5Y 8/1), biomicritic to calcarenitic, abundant forams, fair to good porosity and apparent permeability; trace interbedded clay, grayish brown (5YR 3/2), silty.
1104-1105	1	Limestone, medium dark gray (N4), dolomitic, hard, phosphatic, poor porosity, poor apparent permeability.
1105-1117	12	Limestone, yellowish gray (5Y 8/1), biomicritic to calcarenitic, abundant forams, good porosity and apparent permeability; trace interbedded dolosilt, light gray (N7), soft, dense; trace interbedded dolosilt, light gray (N7), soft, dense.
1117-1122	5	Dolosilt, light gray (N7), soft, dense.
1122-1128	6	Limestone, pale yellowish brown (10YR 6/2), calcarenitic, poorly fossiliferous with some echinoid spines, excellent porosity and apparent permeability.
1128 - 1144	16	Limestone, yellowish gray (5Y 8/1), dolomitic, argillaceous, poor porosity and apparent permeability.
1144 - 1159	15	Clay, yellowish gray (5Y 8/1), firm, sticky.
1159 - 1176	17	Limestone, pale yellowish brown (10YR 6/2), micritic, dolomitic, dense with poor porosity and apparent permeability.
1176 - 1180	6	Clay, yellowish gray (5Y 7/2), soft, dense, sticky; phosphate bed from 1178-1178.5
1180 - 1183	3	Clay, yellowish gray (5Y 7/2), soft, dense, sticky with interbedded limestone; micritic, trace to poor porosity.
1183 - 1187	4	Dolomite, yellowish gray (5Y 7/2), finely crystalline, hard, trace phosphates, trace porosity and apparent permeability.
1187 - 1205	18	Clay, yellowish gray (5Y 7/2), soft to hard, dense to loose, slightly lithified in some parts.
1205 - 1221	16	Limestone, yellowish gray (5Y 8/1), biomicritic to calculititic, hard, minor sparite, fair to good porosity and apparent permeability.
1221 - 1224	3	Limestone, yellowish gray (5Y 7/2), biomicritic to calculititic, hard, minor sparite, poor porosity and apparent permeability; interbedded with dolosilt, light gray (N7), dense, soft.
1224 - 1241	17	Limestone, yellowish gray (5Y 7/2), biomicritic to calculititic, hard, minor sparite, poor porosity and apparent permeability; interbedded with dolosilt, light gray (N7), dense, soft, and clay yellowish gray (5Y 7/2), soft, sticky.
1241 - 1271	19	Dolomite, yellowish gray (5Y 7/2), finely crystalline, hard, phosphates, poor to fair vugular porosity and apparent permeability.
1271-1276	5	Clay, pale yellowish brown (10YR 6/2), dense, soft, sticky, silty, common fine to medium phosphate.
1276-1280	4	Limestone, very pale orange (10YR 8/2), micritic, moderately indurated, minor fine phosphate, poor to fair porosity and apparent permeability.
1280-1295	15	Limestone, very pale orange (10YR 8/2), micritic, moderately indurated, abundant shell fragments, occasional fossils, minor fine phosphate, fair to good porosity and apparent permeability.
1295-1325	30	Limestone, very pale orange (10YR 8/2), biomicritic, moderately indurated, minor shell fragments, slightly moldic, silty, minor quartz sandy, good porosity and apparent permeability.
1325-1335	10	Limestone, very pale orange (10YR 8/2), micritic, moderately indurated, abundant shell fragments, minor fine phosphate, fair to good porosity and apparent permeability.
1335-1345	10	Limestone, very pale orange (10YR 8/2), biomicritic, moderately indurated, minor shell fragments, slightly moldic, fair porosity and apparent permeability.
1345-1366	21	Limestone, very pale orange (10YR 8/2), calcarenitic, poorly to moderately indurated, occasional fossils, common shell fragments, sparry, fair to good porosity and apparent permeability.
1366-1369	3	Clay, yellowish gray (5Y 8/1), soft, sticky, silty.
1370-1400	30	Limestone, very pale orange (10YR 8/2), biomicritic to calcarenitic, poorly to moderately indurated, common fossils, common shell fragments, sparry, fair to good porosity and apparent permeability.

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1400-1425	25	Limestone, yellowish gray (5Y5/2), biomicritic, moderately indurated, abundant fossils, dolomitic, rare interbedded Dolomite, pale yellowish brown (10YR 6/2), microcrystalline, well indurated, hard, poor porosity and apparent permeability.
1425-1428	3	Dolomite, pale brown (5YR 5/2), microsucrossic, dense, poor porosity and apparent permeability.
1428-1468	40	Limestone, yellowish gray (5Y5/2), biomicritic, moderately indurated, abundant fossils, dolomitic, rare interbedded Dolomite, pale yellowish brown (10YR 6/2), microcrystalline, well indurated, hard, poor porosity and apparent permeability.
1468-1475	7	Dolomite, dark yellowish brown (10YR 4/2) to pale yellowish brown (10YR 6/2), microcrystalline, well indurated, hard, minor small vugs, poor porosity and apparent permeability.
1475-1484	9	Limestone, very pale orange (10YR 8/2), calcarenitic, moderately indurated, slightly dolomitic, rare fossils, poor porosity and apparent permeability.
1484-1497	13	Dolomite, pale yellowish brown (10YR 6/2), microcrystalline, well indurated, hard, with interbedded limestone, yellowish gray (5Y 7/2), poorly to moderately indurated, rare spar, poor porosity and apparent permeability.
1497-1504	7	Limestone, very pale orange (10YR 8/2) to yellowish gray (5Y 7/2), calcarinitic, poorly indurated, silty, poor porosity and apparent permeability.
1504-1508	4	Limestone, light olive gray (5Y 6/1), calculutitic, poor porosity and apparent permeability, with some interbedded clay.
1508-1518	10	Clay,very pale orange (10YR 8/2), cohesive, dense, slightly silty.
1518-1545	27	Limestone, very pale orange (10YR 8/2), calcarenitic, poorly to moderately indurated, fair to poor porosity and apparent permeability.
1545-1552	7	Dolomite, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2), microcrystalline to finely crystalline, well indurated, hard, poor porosity and apparent permeability.
1552-1572	20	Limestone, pale yellowish brown (10YR 6/2), biomicritic to slightly calcarenitic, well cemented, dolomitic, poor porosity and apparent permeability.
1572-1620	48	Limestone, pale green yellow (10Y 8/2), biomicritic, moderately indurated, foraminiferous, variably dolomitic, minor spar, fair to poor interparticle and moldic porosity, poor apparent permeability.
1620-1635	15	Limestone, yellowish gray (5Y 7/2), biomicritic, moderately indurated, occasional lignite streaks, fair to good moldic porosity, poor to fair apparent permeability.
1635-1639	4	Limestone, yellowish gray (5Y 7/2), biomicritic, moderately indurated, foraminiferous, poor porosity, poor apparent permeability.
1639-1644	5	Limestone, yellowish gray (5Y 7/2), biomicritic to calcarenitic, moderately indurated, variably moldic, poor to fair moldic porosity, poor apparent permeability.
1644-1647	3	Limestone, yellowish gray (5Y 7/2), biomicritic, abundant forams, moderately indurated to friable, poor moldic porosity, poor apparent permeability.
1647-1652	5	Limestone, yellowish gray (5Y 7/2), biomicritic, abundant forams, moderate to well indurated, lignite streaks, poor moldic porosity, poor apparent permeability.
1652-1660	8	Limestone, yellowish gray (5Y 7/2), biomicritic to calcarenitic, minor spar, variably indurated, poor moldic porosity, poor apparent permeability.
1660-1666	6	Limestone, yellowish gray (5Y 7/2), biomicritic to calcarenitic, moderately indurated, poor to fair moldic porosity, poor apparent permeability.
1666-1669	3	Limestone, yellowish gray (5Y 7/2), micritic to biomicritic, poorly indurated, common lignite, poor moldic porosity, poor apparent permeability.
1669-1697	28	Limestone, yellowish gray (5Y 7/2), biomicritic to calcarenitic, moderately indurated, minor lignite, poor moldic porosity, poor apparent permeability.
1697-1700	3	Limestone, pale greenish yellow (10Y 8/2), biomicritic to calcarenitic, moderate to well indurated, poor to fair moldic porosity, poor apparent permeability.
1700-1711	11	Limestone, olive gray (5Y 3/2), micritic, dolomitic, moderate to well indurated, poor porosity, poor apparent permeability.

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1711-1728	17	Limestone, moderate yellowish brown (10YR 5/4), biomicritic, dolomitic, abundant forams, moderate to well indurated, poor to fair moldic porosity, poor apparent permeability.
1728-1739	11	Limestone, olive gray (5Y 3/2), biomicritic, dolomitic, abundant forams, well indurated, poor moldic porosity, poor apparent permeability.
1739-1745	6	Limestone, olive gray (5Y 3/2) to yellowish gray (5Y 7/2), biomicritic, dolomitic, abundant forams, moderate to well indurated, poor porosity, poor apparent permeability.
1745-1750	5	Limestone, yellowish gray (5Y 7/2), calcisiltite, moderately indurated, poor moldic porosity, poor apparent permeability.
1750-1752	2	Dolomite, moderate yellowish brown (10 YR 5/4), well indurated, very hard, minor pinpoint vugs, microcrystalline, poor porosity and apparent permeability.
1752-1780	28	Dolomite, moderate yellowish brown (10 YR 5/4), well indurated, very hard, occasional pinpoint vugs, microcrystalline, poor porosity and apparent permeability, minor void @ 1765-1765.5'.
1780-1799	19	Dolomite, dark yellowish brown (10 YR 4/2) to dusky yellowish brown (10YR 2/2), well indurated, very hard, occasional pinpoint vugs, microcrystalline, minor succrosic texture on some surfaces, poor porosity and apparent permeability.
1799-1801	2	Limestone, very pale orange (10YR 8/2), calcarenitic, very friable, abundant forams, excellent porosity and apparent permeability.
1801-1815	14	Dolomite, dark yellowish brown (10 YR 4/2), very finely to finely crystalline, poor porosity and apparent permeability.
1815-1815.5	0.5	Limestone, very pale orange (10YR 8/2), calcarenitic, very friable, some forams, excellent porosity and apparent permeability.
1815.5-1820	4.5	Limestone, yellowish gray (5Y 7/2), biomicrite, well indurated w/ calcite cement, common fine molds, common fragments of foraminifera tests and echinoids, occasional mottling w/ dolomite, poor to fair interparticle and moldic porosity, poor apparent permeability
1820-1826	6	Limestone, very pale orange (10 YR 8/2) to pale yellowish orange (10 YR 8/6), coarse calcilutite to fine calcarenite, intraclastic, fair intergranular and dissolution porosity and fair apparent permeability. Intraclasts composed of limestone, very pale orange (10 YR 8/2), micritic, rounded.
1826-1828	2	Dolomite, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), finely crystalline, fair interparticle porosity, poor apparent permeability with angular to subrounded intraclasts of Limestone, very pale orange (10YR 8/2) to pale yellowish orange (10YR 8/6), calciulutitic to micritic, contact with underlying Limestone sharp but irregular.
1828- 1831	3	Limestone, very pale orange (10 YR 8/2) to pale yellowish orange (10 YR 8/6), calculutitic to micritic, intraclastic, fair intergranular and dissolution porosity and fair apparent permeability. Intraclasts composed of Limestone, very pale orange (10 YR 8/2), micritic, intraclasts, rounded.
1831- 1843	12	Dolomite, dusky yellowish brown (10YR 2/2), fine to medium crystalline, good to excellent vuggy porosity, with vugs lined with drusy, sucrosic dolomite, poor apparent permeability.
1843- 1856	13	Dolomite, dusky yellowish brown (10YR 2/2), fine to medium crystalline, abundant fine to coarse dolomitic sand, subangular, moderate to high sphericity, good to excellent vuggy porosity with vugs lined with drusy, sucrosic dolomite, poor apparent permeability.
1856- 1868	12	Dolomite, dusky yellowish brown (10YR 2/2), fine to medium crystalline, fair vuggy porosity, with vugs lined with drusy, sucrosic dolomite, poor apparent permeability.
1868- 1879	11	Dolomite, dusky yellowish brown (10YR 2/2) to pale brown (5YR 5/2), fine to medium crystalline, common microfracturing, good vuggy and fracture porosity with vugs lined with drusy, sucrosic dolomite, poor apparent permeability.
1879- 1881	2	Dolomite, dusky yellowish brown (10YR 2/2) to pale brown (5YR 5/2), fine to medium crystalline, minor loose fine to coarse dolomitic sand, fair vuggy porosity, with vugs lined with drusy, sucrosic dolomite, poor apparent permeability.
1881- 1883	2	Void.

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1883- 1889	6	Dolomite, dusky yellowish brown (10YR 2/2), fine to medium crystalline, fair vuggy porosity with vugs lined with drusy, sucrosic dolomite, poor apparent permeability.
1889- 1891	2	Dolomite, grayish orange (10YR 7/4), sucrosic, medium crystalline, good to excellent intercrystalline porosity, fair to good apparent permeability.
1891- 1920	29	Dolomite, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), finely crystalline, poor intercrystalline porosity and apparent permeability; may be interbedded with thin stringers of Limestone, yellowish gray (5Y 8/1), coarse calcilutite to to fine calcarenite, especially from 1913' - 1915 bpl. and 1917' - 1920' bpl.
1920-1941	21	Dolomite, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), fine to medium crystals, poor to fair intercrystalline and vuggy porosity, poor apparent permeability; rare interbedded stringers of Limestone, yellowish gray (5Y 8/1), calculutitic to micritic, poorly indurated, fair dissolution porosity and apparent permeability.
1941-1945	4	Limestone, yellowish gray (5Y 7/2), coarse calcilutite to fine calcarenite, dolomitic, with Dolomite occurring as dispersed, fine sand-sized rhombs, abundant forams, trace to poor fine intergranular porosity and apparent permeability.
1945-1946	1	Dolomite, brownish black (5YR 2/1), finely crystalline, well-indurated, dense with trace fine fracture to vuggy porosity and trace apparent permeability.
1946-1951	5	Limestone, grayish orange (10YR 7/4), coarse calcilutite to fine calcarenite, fair intergranular porosity and apparent permeability.
1951-1957	6	Dolomite, dusky yellowish brown (10YR 2/2), finely crystalline, trace to poor intercrystalline porosity and apparent permeability; interbedded with Limestone, grayish orange (10YR 7/4), calculutitic to micritic, fair intergranular porosity and apparent permeability, especially near the bottom.
1957-1965	8	Limestone, very pale orange (10YR 8/2), coarse calcilutite to fine calcarenite, abundant forams, some dusky yellowish brown (10YR 2/2) wavy laminations around 1961-1962' bpl., interbedded with Dolomite, dark yellowish brown (10YR 4/2) from 1962 to 1965' bpl, fair to good intercrystalline porosity and apparent permeability.
1965-1967	2	Dolomite, dusky yellowish brown (10YR 2/2), finely crystalline, trace to poor intercrystalline porosity and apparent permeability.
1967-1977	4	Dolomite, dark yellowish brown (10YR 4/2), finely crystalline, poor intercrystalline porosity and apparent permeability, interbedded with Limestone, very pale orange (10YR 8/2), fine calcarenite, with embedded dolomite rhombs, abundant forams, poor intergranular porosity and poor apparent permeability.
1977-1984.5	7.5	Limestone, very pale orange (10YR 8/2), coarse calcilutite to to fine calcarenite, dolomitic, with abundant embeded fine to medium dolomite rhombs, poor to fine intergranular porosity and apparent permeability.
1984.5-1987.5	3	Dolomite, dark yellowish brown (10YR 4/2), finely crystalline, poor intercrystalline porosity and apparent permeability, interbedded with Limestone, very pale orange (10YR 8/2), calculutitic to micritic, with embedded dolomite rhombs, fair to good porosity and apparent permeability.
1987.5-1990	2.5	Limestone, very pale orange (10YR 8/2), coarse calcilutite to fine calcarenite, rare forams, fair intergranular porosity and apparent permeability.
1990-1993	3	Dolomite, dark yellowish brown (10YR 4/2), finely crystalline, poor intercrystalline porosity and apparent permeability, interbedded with Limestone, very pale orange (10YR 8/2), calculutitic to micritic, fair porosity and apparent permeability.
1993-1994	1	Limestone, very pale orange (10YR 8/2), coarse calcilutite to to fine calcarenite, rare forams, fair intergranular porosity and apparent permeability.
1994-1998	4	Dolomite, dark yellowish brown (10YR 4/2), finely crystalline, poor intercrystalline porosity and apparent permeability, interbedded with Limestone, very pale orange (10YR 8/2), calcilutitic to micritic, poor to fair porosity and apparent permeability.
1998-2002.5	4.5	Limestone, very pale orange (10YR 8/2), coarse calcilutite to to fine calcarenite, abundant forams in lower part, fair intergranular porosity and apparent permeability.
2002.5-2006	3.5	Dolomite, dark yellowish brown (10YR 4/2), finely crystalline, poor intercrystalliner porosity and apparent permeability.

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2006-2007	1	Limestone, very pale orange (10YR 8/2), coarse calcilutite to fine calcarenite, fair intergranular porosity and apparent permeability.
2007-2012.5	5.5	Dolomite, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), finely crystalline, poor intercrystalline porosity and apparent permeability.
2012.5-2018	5.5	Limestone, very pale orange (10YR 8/2), coarse calcilutite to fine calcarenite, common forams, fair intergranular porosity and apparent permeability.
2018-2022.5	4.5	Dolomite, dusky yellowish brown (10YR 2/2), finely crystalline, poor intercrystalline porosity and apparent permeability.
2022.5-2024.5	2	Limestone, yellowish gray (5Y 7/2), coarse calcilutite to fine calcarenite, dolomitic, with abundant embedded fine to medium dolomite rhombs, common forams including *Camerina aff. C. vanderstoki* and orbitoids, trace to poor porosity and apparent permeability.
2024.5 - 2027	2.5	Dolomite, dusky yellowish brown (10YR 2/2), finely crystalline, poor intercrystalline porosity and apparent permeability.
2027-2028	1	Limestone, yellowish gray (5Y 7/2), coarse calcilutite to fine calcarenite, dolomitic, with abundant embedded fine to medium dolomite rhombs, common to abundant forams including *Camerina aff. C. vanderstoki*, and orbitoids, trace to poor porosity and apparent permeability.
2028-2030	2	Dolomite, dusky yellowish brown (10YR 2/2), finely crystalline, poor intercrystalline porosity and apparent permeability.
2030-2054	24	Dolomite, grayish orange (10YR 7/4), slightly calcitic, finely to very finely crystalline, dense, trace intercrystalline porosity and apparent permeability.
2054-2063	9	Limestone, yellowish gray (5Y 8/1), coarse calcilutite to fine calcarenite, dolomitic with finely disseminated dolomite rhombs, trace porosity and apparent permeability.
2063-2065	2	Dolomite, dark yellowish brown (10YR 4/2), finely crystalline, poor intercrystalline to vuggy porosity and apparent permeability.
2065-2067	2	Limestone, yellowish gray (5Y 8/1), micritic to fine calcarenite, dolomitic, with finely diseminated dolomite rhombs, trace porosity and apparent permeability.
2067-2080	13	Dolomite, dark yellowish brown (10YR 4/2), finely crystalline, poor intercrystalline to vuggy porosity and apparent permeability.
2080-2089	9	Limestone, very pale orange (10YR 8/2), coarse calcilutite to fine calcarenite, fair intergranular porosity and apparent permeability.
2089-2100	11	Dolomite, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), finely crystalline, poor intercrystalline porosity and apparent permeability.
2100-2133	33	Limestone, very pale orange (10YR 8/2), calcarenitic at top becoming micritic at base, wavy laminations in micritic part, abundant forams in upper part including *Camerina* aff. *C. vanderstoki* and *Lepidocyclina* cf. *L. ocalana*, fair intergranular porosity and apparent permeability.
2133-2135	2	Dolomite, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), finely crystalline, poor intercrystalline porosity and apparent permeability.
2135-2143	8	Limestone, very pale orange (10YR 8/2), coarse calcilutite to fine calcarenite, fair intergranular porosity and apparent permeability.
2143- 2160	17	Dolomite, dark yellowish brown (10YR 4/2), medium crystalline, friable, excellent intercrystalline porosity and apparent permeability.
2160- 2166	6	Limestone, yellowish gray (5Y 8/1), micritic to calcarenitic, some forams, trace microcrystalline dolomite black (N1), poor intergranular porosity and apparent permeability.
2166- 2172	6	Limestone, yellowish gray (5Y 8/1) to light medium gray (N7) to white (N9), micritic to calcarenitic, grading from calcarenitic to micritic and back, some forams, poor intergranular porosity and apparent permeability.
2172- 2182	10	Dolomite, dusky yellow (5Y 6/4) to dark yellowish brown (10 YR 2/2), finely crystalline, poor vuggy porosity and apparent permeability; interbedded with sucrosic dolomite, with excellent vuggy porosity and apparent permeability.
2182- 2186	4	Dolomite, dusky yellow (5Y 6/4) to dark yellowish brown (10 YR 2/2), finely crystalline, some lignite, poor vuggy porosity and apparent permeability.

LITHOLOGIC LOG

Depth Interval (feet bpl)	Thickness (feet)	Sample Description
2186- 2199	13	Dolomite, dusky yellowish brown (10YR 4/2) to dusky yellow (5Y 6/4), finely crystalline, fair to good vuggy porosity and apparent permeability.
2199- 2212	13	Dolomite, dusky yellowish brown (10YR 4/2) to dusky yellow (5Y 6/4), finely crystalline, abundant lignite, poor dissolution porosity and apparent permeability.
2212- 2222	10	Dolomite, dusky yellowish brown (10YR 4/2) to dusky yellow (5Y 6/4), finely crystalline, poor to excellent dissolution and vuggy porosity and apparent permeability.
2222- 2245	23	Dolomite, pale yellow brown (10YR 6/2), very finely to finely crystalline, poor to fair dissolution porosity and apparent permeability.
2245- 2264	19	Dolomite, pale yellow brown (10YR 6/2) to dark yellowish brown (10YR 4/2), very finely to finely crystalline, some anhydrite, poor to fair dissolution porosity and apparent
2264- 2271	7	Dolomite, pale yellow brown (10YR 6/2), finely crystalline, some anhydrite, poor dissolution porosity and apparent permeability.
2271- 2278	7	Dolomite, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2), finely crystalline, minor lignite, some anhydrite, poor dissolution porosity and apparent permeability.
2278- 2280	2	Dolomite, pale yellow brown (10YR 6/2) to dark yellowish brown (10YR 4/2), finely crystalline, well indurated, some anhydrite, minor lignite, excellent dissolution porosity and apparent permeability; rare Limestone, dolomitic, poor vuggy porosity and apparent permeability.
2280-2284	4	Dolomite, dark yellowish brown (10YR 4/2), microcrystalline, well indurated, minor anhydrite, poor porosity and apparent permeability.
2284-2295	11	Dolomite, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2), finely crystalline, minor lignite, some anhydrite, poor porosity and apparent permeability.
2295-2308	13	Limestone, pale yellowish brown (10YR 6/2), calcarenitic, micritic, poorly indurated, slightly dolomitized, minor anhydrite, some interbedded lignite, poor porosity and apparent permeability.
2308-2341	33	Dolomite, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2), finely crystalline, calcareous, minor lignite, poor porosity and apparent permeability.
2341-2354	13	Limestone, yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), micritic, dolomitic, poorly indurated, some interbedded lignite, fair porosity and apparent permeability.
2354-2371	11	Dolomite, pale yellow brown (10YR 6/2) to dark yellowish brown (10YR 4/2), finely crystalline, well indurated, slightly calcareous, minor lignite, poor porosity and apparent permeability.
2371-2389	18	Limestone, yellowish gray (5Y 8/1), micritic to calcarenitic, poorly to moderately indurated, anhydritic, poor intergranular porosity and apparent permeability.
2389-2393	4	Dolomite, pale yellowish brown (10YR 6/2) to medium gray (N5), mottled, anhydritic, finely crystalline, well indurated, common vugs, poor porosity and apparent permeability.
2393-2402	9	Dolomite, dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4), microcrystalline to finely crystalline, well indurated, hard, calcareous, minor marl and lignite, minor small vugs, poor to fair porosity and poor apparent permeability.
2402-2442	40	Limestone, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), poorly to moderately indurated, common molds and vugs, dolomitic, minor anhydrite, poor to fair porosity and apparent permeability.
2442-2446	4	Dolomite, dark yellowish brown (10YR 4/2), microcrystalline to finely crystalline, well indurated, hard, poor porosity and apparent permeability.
2446-2450	4	Limestone, pale yellowish brown (10YR 6/2), poorly to moderately indurated, dolomitic, minor lignite, poor porosity and apparent permeability.
2450- 2452	2	Lignite, brownish black (5YR 4/1).
2452-2460	8	Clay, brownish black (5YR 2/1), soft, sticky, organic, common lignite, common limestone and anhydrite.
2460- 2497	37	Limestone, pale yellowish brown (10YR 6/2), poorly to moderately indurated, dolomitic, minor lignite, minor anhydrite, poor porosity and apparent permeability.

LITHOLOGIC LOG

Depth Interval (feet bpl)	Thickness (feet)	Sample Description
2497- 2528	31	Limestone, yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), micritic to calcarenitic, slightly dolomitized, some forams including *Camerina* aff. *C. vanderstoki* and *Dictyoconus cookei*, some organics including lignite, minor anhydrite, fair intergranular porosity and apparent permeability.
2528- 2556	28	Limestone, yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), calcarenitic, slightly dolomitized, minor lignite, some forams including *Dictyoconus cookei*, poor intergranular porosity and apparent permeability.
2556- 2558	2	Dolomite, dark yellowish brown (10YR 2/2), very finely crystalline, poor porosity and apparent permeability.
2558- 2575	17	Limestone, yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), calcarenitic, slightly dolomitized, some lignite, abundant forams including *Camerina* aff. *C. vanderstoki*, *Dictyoconus cookei* and *Quinqueloculina*? sp., minor anhydrite, poor intergranular porosity and apparent permeability.
2575- 2584	9	Dolomite, pale yellowish brown (10YR 6/2), very finely to finely crystalline, some anhydrite, common ghost allochems, poor porosity and apparent permeability.
2584- 2599	15	Limestone, yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), calcarenitic, slightly dolomitized, minor lignite, minor forams, poor intergranular porosity and apparent permeability with stringers of Dolomite, pale yellowish brown (10YR 6/2), very finely to finely crystalline, some anhydrite, poor porosity and apparent permeability.
2599- 2608	9	Dolomite, pale yellowish brown (10YR 6/2), very finely to finely crystalline, calcareous, some anhydrite, minor lignite, poor porosity and apparent permeability.
2608- 2618	10	Limestone, yellowish gray (5Y 8/1), micritic to calcarentic, slightly dolomitic, poor intergranular porosity and apparent permeability.
2618 2652	34	Dolomite, dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4), microcrystalline to finely crystalline, well indurated, hard, calcareous, some anhydrite, poor porosity and poor apparent permeability; with interbedded Limestone, yellowish gray (5Y 8/1), calcarentic, slightly dolomitic, excellent intergranular porosity and apparent permeability.
2652- 2665	13	Limestone, yellowish gray (5Y7/2), calcarentic to micritic, slightly dolomitic, minor lignite, poor to fair intergranular porosity and apparent permeability, with stingers of Dolomite, dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4), microcrystalline to finely crystalline, well indurated, hard, calcareous;and Dolosilt, black (N1) to dusky green (5G 3/2).
2665- 2669	4	Dolomite, pale yellowish brown (10YR 6/2), very finely to finely crystalline, calcareous, some anhydrite, minor lignite, poor porosity and apparent permeability.
2669-2687	18	Limestone, pale yellowish brown (10YR 6/2), poorly to moderately indurated, dolomitic, minor lignite, minor anhydrite, poor porosity and apparent permeability.
2687-2694	7	Dolomite, dark yellowish brown (10YR 6/2) to dusky yellowish brown (10YR 2/2), finely crystalline, well indurated, occasional fossils including forams, poor porosity and apparent permeability.
2694-2714	20	Limestone, pale yellowish brown (10YR 6/2), poorly to moderately indurated, dolomitic, common lignite, minor anhydrite, poor porosity and apparent permeability.
2714-2722	8	Dolomite, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2), well indurated, finely crystalline, minor lignite, poor porosity and apparent permeability.
2722-2756	34	Limestone, very pale orange (10YR 8/2), calcarenitic, medium-grained, moderately to poorly indurated, slightly dolomitized, minor lignite, occasional anhydrite, poor porosity and apparent permeability.
2756-2761	5	Dolomite, dark yellowish brown (10YR 6/2) to dusky yellowish brown (10YR 2/2), finely crystalline, well indurated, common lignite, poor porosity and apparent permeability.
2761-2768	7	Limestone, very pale orange (10YR 8/2), calcarenitic/micritic, fine-grained, moderately to poorly indurated, slightly dolomitized, minor lignite, minor anhydrite, poor porosity and apparent permeability.

LITHOLOGIC LOG

Depth Interval (feet bpl)	Thickness (feet)	Sample Description
2768-2771	3	Dolomite, pale yellowish brown (10YR 6/2), finely crystalline, calcareous, some lignite, poor porosity and apparent permeability.
2771-2788	17	Limestone, very pale orange (10YR 8/2), calcarenitic/micritic, fine-grained, moderately to poorly indurated, slightly dolomitized, minor lignite, minor anhydrite, poor porosity and apparent permeability.
2788-2793	5	Dolomite, dark yellowish brown (10YR 6/2) to dusky yellowish brown (10YR 2/2), finely crystalline, well indurated, minor lignite, poor porosity and apparent permeability.
2793-2797	4	Limestone, very pale orange (10YR 8/2), calcarenitic to micritic, fine-grained, moderately to poorly indurated, slightly dolomitized, minor lignite, minor anhydrite, poor porosity and apparent permeability.
2797-2801	4	Dolomite, dark yellowish brown (10YR 6/2), finely crystalline, well indurated, some lignite, poor porosity and apparent permeability.
2801-2828	27	Limestone, yellowish gray (5Y 7/2), calcarenitic, variably dolomitized, poorly to moderately indurated, occasional lignite, minor anhydrite, poor porosity and apparent permeability.
2828-2835	7	Dolomite, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2), well indurated, finely crystalline, minor lignite, poor porosity and apparent permeability.
2835-2841	6	Dolomite, dark yellowish brown (10YR 4/2), very well indurated, finely crystalline, minor lignite, poor porosity and apparent permeability.
2841-2854	13	Limestone, yellowish gray (5Y 8/1), calcarentic, slightly dolomitic, minor lignite, fair to good intergranular porosity and apparent permeability.
2854-2858.5	4.5	Dolomite, moderate olive brown (5Y 4/4), microcrystalline to very finely crystalline, moderately well indurated, calcareous, abundant thin seams of lignite, common fragments of anhydrite, poor porosity, poor apparent permeability
2858.5-2859.5	1	Dolomite, as above, interbedded with lignite, black (N1), soft, fissile, minor anhydrite, poor porosity, poor apparent permeability
2859.5-2867	7.5	Dolomite, moderate olive brown (5Y 4/4), very fine to microcrystalline, moderately well indurated, pin-point vuggy, minor pore-filling anhydrite, common to abundant lignite, poor to fair vuggy porosity, poor apparent permeability
2867-2868	1	Limestone, yellowish gray (5Y 7/2), biomicrite, poorly indurated, variably lignitic, minor seam of lignite, fair to poor moldic porosity, poor apparent permeability
2868-2873	5	Dolomite, moderate olive brown (5Y 4/4), very fine to microcrystalline, moderately well indurated, pin-point vuggy, common anhydrite, fair vuggy porosity, fair apparent permeability, common fragments of dolomitic biomicritic limestone, some lignite.
2873-2881	8	Limestone, yellowish gray (5Y 7/2) and moderate olive brown (5Y 4/4), biomicrite, dolomitized, moderately well indurated, common lignite, fair moldic porosity, poor apparent permeability
2881-2890	9	Limestone, yellowish gray (5Y 7/2), biomicrite to calcarenitic, common lignite, moderately well indurated, partially dolomitic, some forams including *Quinqueloculina*? Sp., fair moldic porosity, fair to poor apparent permeability.
2890-2908	18	Dolomite, dusky yellow (5Y 6/4), fine to medium crystalline, sucrossic, calcareous, moderately to poorly indurated, poor to fair moldic and intercrystalline porosity, poor apparent permeability, some lignite near top.
2908-2918	7	Limestone, yellowish gray (5Y 7/2), micrite, cryptocrystalline, well indurated, hard, slightly dolomitic, minor pin-point vugs, some lignite, poor porosity, poor apparent permeability
2918-2930	12	Limestone, yellowish gray (5Y 7/2), biomicritic to calcarenitic, moderately indurated, variably dolomitic, some lignite, good to fair moldic porosity, fair apparent permeability
2930-2964	34	Limestone, yellowish gray (5Y 7/2) to grayish orange (10YR 7/4), biomicritic to calcarenitic, moderately indurated to friable, variably dolomitic, minor pin-point vugs, minor lignite, poor to fair vuggy porosity, poor apparent permeability.
2964-2978	14	Dolomite, grayish olive (10Y 4/2) to dusky yellow (5Y 6/4), fine to microcrystalline, well indurated, pin-point vuggy, some anhydrite, poor to fair vuggy porosity, poor apparent permeability.

LITHOLOGIC LOG

Depth Interval (feet bpl)	Thickness (feet)	Sample Description
2978-2985	7	Dolomite, moderate yellowish brown (10YR 5/4), medium-coarse to microcrystalline, well indurated, vuggy, good vuggy and interparticle porosity, fair to good apparent permeability.
2985-2993	8	Limestone, yellowish gray (5Y 7/2), biomicrite, moderately well indurated, dolomitic, variably pin-point vuggy, fair vuggy and interparticle porosity, poor apparent permeability.
2993-3010	17	Dolomite, moderate yellowish brown (10YR 5/4), micro- to finely crystalline, well indurated to friable, sucrossic in part, pin-point vuggy, common lignite at 3000 ' bpl, fair to good vuggy porosity, fair apparent permeability.
3010-3015	5	Limestone, medium light gray (N6) and yellowish gray (5Y 8/1), biomicritic, moderately well indurated, minor pin-point vugs, marly, poor vuggy and interparticle porosity, poor apparent permeability.
3015-3022	7	Dolomitic Sand, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), sub-angular, some calcareous clay, white (N9) to yellowish gray (5Y 8/1), firm.
3022-3029	7	Limestone, light olive gray (5Y 6/1 to 5Y 5/22), grainstone, mictritic, well indurated, occasional dolomite, common fine phosphate, fair intergranular porosity and apparent permeability.
3029-3034	5	Dolomite, pale yellowish brown (10YR 6/2), well indurated, hard, crystalline, fine to medium grained, vuggy, fair to good porosity and apparent permeability.
3034-3038	4	Limestone, yellowish gray (5Y 7/2) and pale olive (10Y 6/2), biomicrite, fine-grained, moderately indurated to friable, dolomitized, common fine molds, fair moldic and interparticle porosity, poor apparent permeability.
3038-3048	10	Dolomite, moderate olive brown (5Y 4/4), v. fine-grained to medium-grained, moderately indurated, vuggy, good vuggy and interparticle porosity, fair apparent permeability.
3048-3055	7	Dolomite, olive gray (5Y 3/2) to olive black (5Y 2/1), medium-grained, moderately indurated, abundant pin-point vugs, excellent interparticle porosity, good vuggy porosity, good apparent permeability. Note: Perfect rhomb crystal structure.
3055-3064	9	Dolomite, moderate yellowish brown (10YR 5/4) and olive gray (5Y 3/2), fine to medium-grained, moderately well indurated, abundant pin-point vugs, good interparticle and vuggy porosity, good apparent permeability.
3064-3073	9	Dolomite, light olive gray (5Y 5/2) and moderate yellowish brown (10YR 5/4), finely crystalline, well indurated, variably (occasional to common) pin-point vuggy, poor vuggy porosity, poor apparent permeability.
3073-3079	6	Dolomite, moderate yellowish brown (10YR 5/4), fine to medium-grained, moderately well indurated, abundant pin-point vugs, good interparticle and vuggy porosity, good to fair apparent permeability, interbedded with dolomite as above, poor vuggy porosity, poor apparent permeability. Note: Minor dredging within the interval between 3073 and 3075 feet bpl.
3079-3105	26	Dolomite, light olive gray (5Y 5/2) and olive gray (5Y 3/2), finely crystalline to microcrystalline, well indurated, hard, variably (occasional to minor) pin-point vuggy, poor porosity, poor apparent permeability.
3105-3117	12	Dolomite, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), crystalline, fine to medium-grained, well indurated, minor pin-point vugs, poor intercrystalline porosity and apparent permeability.
3117-3118	1	Same as above, with the addition of Dolomite, moderate yellowish brown (10YR 6/2) to dusky yellowish brown (10YR 2/2), crystalline, fine to medium grained, well indurated, occasional vugs, fair porosity and apparent permeability.
3118-3124	6	Dolomite, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), crystalline, fine to medium-grained, well indurated, minor pin-point vugs, poor intercrystalline porosity and apparent permeability.

LITHOLOGIC LOG

Depth Interval (feet bpl)	Thickness (feet)	Sample Description
3124-3138	14	Dolomite, dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4), microcrystalline, coarser crystals of carbonate cement on some surfaces, well indurated, hard, variably (occasional to minor) pin-point vuggy, poor porosity, poor apparent permeability.