HYDROLOGY AND GEOLOGY OF A PROPOSED NEW WELL FIELD SITE IN SOUTH LEE COUNTY, FLORIDA

PREPARED FOR

LEE COUNTY

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APPENDIX A

GEOLOGIST'S LOGS

Table A-1 Geologist's Log L-M-922

Depth (feet)	Description
0-3	Sand, quartz, light tan, fine to very fine.
3-5	Limestone, light brown, sandy, hard.
5-7	Sand, quartz; with yellow clay, limestone and sandstone fragments.
7-11	Limestone, brown; micro-crystalline, some quartz sand, hard.
11-13	Sandstone, brown; with yellow-brown clay.
13-17	Silt, brown; with quartz sand and clay, weathered limestone fragments, paleosol horizon.
17-24	Limestone, soft, marly, white, more than 50% biogenic, shell detritus, Pleistocene fossils.
24-34	Shell, with fragments of consolidated light gray limestone and calcareous sandstone, Pleistocene fossils.
34-36	Limestone, light gray, cemented, hard, biogenic.
36-42	Shell, with limestone fragments, Pleistocene fossils.
42-47	Limestone, gray, very hard, small shell fragments.
47-51	Limestone, gray to light gray, hard to medium hard, cemented shell fragments, micro-crystalline texture.
51-53	Limestone, steel gray to nearly blue very hard micro-crystalline, may be dolomitic.

(Con't.)

Table A-1 (Con't.).

Depth (feet)	Description
53-66	Limestone, gray, medium hard, interbedded light gray limestone, some shell.
66-77	Limestone, medium hard, few fossils,, gray.
77-84	Limestone, light gray, fossiliferous, molds, sponge-like, small vugs.
84-94	Limestone, gray, slightly harder than above.
94-104	Limestone, gray and light gray, interbedded, soft.
104-113	Limestone, light gray, shelly, bryzoans, soft.
113-120	Clay, dark green, carbonate, some weathered rock fragments and barnacle fragments.
120-124	Clay, dark green to gray, silty, barnacle fragments.
124-130	Clay, green-gray, silty, shelly.
130-138	Clay, green, carbonate, fat, slightly phosphatic.
138-144	Clay, green, same as above, microfossils.
144-146	Clay, green, some phosphate, few shell fragments.
146-156	Limestone, light gray, some fossils.
156-164	Limestone, light gray, same generally as above, granular nature perhaps pelleted.
164-174	Limestone, lt. gray to gray, cemented lime sand.
174-196	Limestone, lt. gray, same as above, little if any quartz sand.

(Con't.)

Table A-1 (Con't.).

Depth (feet)	Description
196-204	Sandstone, light gray, cemented by carbonate micrite, shelly, nearly unconsolidated.
204-212	Sand, quartz, very fine, same carbonate mud (3-5%).
212-218	Sandstone, light gray, same as above, calcareous cement, shell, some phosphate.
218-228	Sand and silt, quartz, gray, with 5-10% carbonate clay, phosphatic.
228-240	Sandstone, with interbedded quartz sand and silt, shelly.
234-244	Sandstone, gray, minor interbedded sand, slightly shelly.
244-264	Poor sample, quartz sand, soft partially consolidated sandstone.
264-284	Sandstone and sand, poorly consolidated, finer grained with depth.
284-294	Mud, gray to green, mixed quartz sand, silt and carbonate clay, shelly.
294-304	Mud, green, siltly, phosphatic, some quartz sand.

Table A-2 Geologist's Log L-M-923.

Depth (ft.)	Description
0-14	Sand, quartz, gray, very fine, some shell, some brown sandstone.
14-24	Sand, quartz, very fine, silt and clay 5-15%, light gray, interbedded laminae of clay, dark brown.
24-29	Silt, light gray to gray, with very fine quartz sand, higher percentage of silt and clay than above.
29-36	Limestone, light gray, Pleistocene fossils, shell, medium hardness.
36-44	Limestone, light tan to light gray, shelly, some carbonate sand.
44-47	Limestone, same as above, with interbedded hard gray limestone (no sample).
47-50	Shell, unconsolidated, with some interbedded light brown sandstone (quartz).
50-60	Limestone, shelly, loosely consolidated shell beds, lt. tan to lt. gray.
60-64	Limestone, gray, hard, some shell.
64-80	Limestone, light gray, medium hardness, vugged, all carbonate, some shell.
80-84	Limestone, gray, partially consolidated, marly, carbonate mud mixed with rock fragments, clay = 5-10%, shell.
84-88	Limestone, gray, medium hard, porous, some shell.
88-104	Limestone and marl, interbedded, gray, upper part coralline, marl contains shell perhaps sand, reef complex.
104-114	Limestone, light gray, porous, medium hard, some shell fragments.
114-124	Limestone, light tan to tan, hard, high porosity.

(Con't.)

Table A-2 (Con't.). Geologist's Log L-M-923.

Depth (ft.)	Description
124-134	Limestone, gray to light gray, thin hard beds and overall medium hardness.
134-138	Limestone, lt. gray, medium hard, with thin very hard beds, brownish dolomite (?) beds.
138-144	Limestone, partially unconsolidated, lt. gray, marly.
144-154	Limestone lt. gray, marl, more clay than above (Buckingham ?).
154-158	Marl, gray to light brown, unconsolidated, barnacles, shell fragments.
158-164	Clay, dark green, carbonate, some shell, silty.
164-174	Clay, green, very silty, thinner than above.
174-184	Clay, green (lighter than above), less silt, fat.
184-200	Clay, dark green, microfossils, silty.
200-204	Limestone, gray, cemented carbonate sand.
204-213	Limestone, light gray, medium hard, some shell.
213-214	Limestone, tan; sample does not reflect color, thin bed.
214-224	Sandstone, gray-lt. tan, medium hard some shell; quartz sand (very fine) cemented by carbonate.
224-228	Sandstone, gray, loosely consolidated, some partially consolidated carbonate mud, low porosity.
228-238	Sandstone, lt. tan, with shell, loosely consolidated, soft, Bryzoans, moderate to poor permeability.

(Con't.)

Table A-2 (Con't.). Geologist's Log L-M-923.

Depth (ft.)	Description
238-244	Sandstone, lt. gray to lt. tan, shelly, soft.
244-254	Sandstone, lt. gray, nearly unconsolidated quartz sand and shelly, minor percent of carbonate mud.
254-259	Sandstone, gray, soft, poorly consolidated, high percentage of carbonate silt with very fine quartz sand.
259-264	Sandstone and sand, gray, with shell and carbonate silt, poor permeability.
264-269	Sandstone, gray to lt. gray, medium hard, some phosphate, some molds and casts.
269-284	Sandstone, lt. gray, shelly, soft but well consolidated.
284-292	Marl, gray, carbonate mud with quartz sand and silt, shelly.
292-299	Sand and sandstone, gray-green, with carbonate clay, some shell, poor permeability.
299-304	Sandstone, lt. gray, hard, same interbedded soft marl, shelly.
304-309	Sandstone, sand, and green clay, interbedded with shell, phosphatic.
309-324	Clay, green; more than 50% quartz silt and sandy.

Table A-3 Geologist's Log L-M-924

Depth (ft.)	Description
0-2	Sand, quartz, brown to light brown, medium to very fine grain size.
2-4	Clay and sand, yellow, quartz sand mixed with residual soil clay, true clay mineral assemblage.
4-22	Sand, quartz, light tan to light gray, very fine grain, some shell near base.
22-23	Limestone, light tan, shelly, very soft.
23-40	Sand and shell, light tan, very fine to silt grain-size, thin shell fragments.
40-43	Limestone, sandy, gray to light brown, very hard.
43-44	Shell, medium-size whole fossils, Chione cancellata, Chlamys sp. etc., probable Pleistocene assemblege.
44-60	Limestone, light gray and light tan, poorly consolidated, bedded shell, same as above.
60-64	Limestone, gray, hard, fairly pure $CaCO_3$, little or no quartz sand.
64-66	Limestone, gray, same generally as above, small vugs, imbedded fossil shell.
66-74	Limestone, gray, not as dark as above, hard.
74-84	Limestone light gray, soft, with shell and some unconsolidated carbonate silt, heavy water loss zone at top.
84-89	Limestone, gray, shell fragments, soft, nearly same as above.
89-99	Limestone, light gray to buff, shelly, same generally as above with some silt.
99-104	Limestone, silty, partially consolidated carbonate shell fragments and lime mud.

(Con't.)

Table A-3 (Con't.). Geologist's Log L-M-924.

104-114	Limestone, light gray, shell fragments, some bedded carbonate silt.
114-118	Limestone, lt. tan to buff, some light brown, consolidated.
118-124	Limestone, lt. brown, medium hard, vugged.
124-134	Limestone, light gray, medium hard, very porous.
134-144	Limestone, light gray, same as above.
144-148	Limestone, nearly white, medium hard, very porous.
148-155	Limestone, light tan to light gray, silty.
155-159	Marl, light gray to gray carbonate mud, limestone fragments and shell.
159-164	Clay, green, carbonate, shell fragments, fat.

Table A-4 Geologist's Log L-M-926.

Depth (ft.)	Description
0-4	Sand, quartz, dark brown, organic, iron-stained, very fine, slightly clayey.
4-7	Sand, quartz, brown, same generally as above with less clay, some weathered rock fragments.
7-10	Sandstone, lt. gray, medium hard, very fine quartz sand +80% cemented by carbonate.
10-15	Sand, quartz, lt. brown to tan, very fine, clean.
15-24	Sandstone, lt. brown, shelly, shells appear weathered, overall sequence medium hard, very permeable.
24-26	Shell, thin bed, unconsolidated shell, mostly *Chione cancellata*.
26-30	Sandstone and shell, interbedded, sandstone is medium hard to hard, shell sequence is Pleistocene, high permeability.
30-34	Limestone, lt. gray, sandy, medium hard to hard, some shell.
34-39	Sandstone, lt. gray, hard, tightly cemented, some shell and molds and casts.
39-44	Limestone, lt. gray, very hard, trace of very fine quartz sand, medium porosity.
44-50	Limestone, gray, clean with some shell, higher porosity than above.
50-64	Limestone, lt. tan to dark gray, very hard light color limestone - very permeable, darker limestone very hard - medium porosity.
64-74	Limestone, lt. gray, medium hard, trace of shell, high porosity.

(Con't.)

Table A-4 (Con't.). Geologist's Log L-M- 926.

Depth (ft.)	Description
74-79	Limestone, gray, hard to medium hard, same as above.
79-84	Limestone, gray, very hard, shelly, probably interbedded, high porosity.
84-87	Marl, gray, mixture of gray carbonate mud and rock fragments.
87-94	Clay, green, carbonate, silty, abundant micro-fossils, fat.
94-104	Clay, green, slightly silty, fairly clean, abundant micro-fossils.
104-114	Clay, green, light color than above, carbonate, less silt than above.
114-124	Clay, green, same as above with some shell fragments.
124-126	Clay, green, some weathered rock and shell fragments, phosphorite nodules.
126-134	Limestone, fray-tan, slightly phosphatic, some shell, medium hard, medium porosity.
134-144	Limestone, gray-tan, slightly sandy, trace of shell, medium hard, medium porosity.
144-146	Limestone, gray-tan to tan, sandy, same as above.
146-155	Sandstone, tan, very fine quartz sand and very fine micro-phosphorite nodules.
155-164	Sandstone, tan, more than 60% shell fragments nearly unconsolidated, soft, very porous.
164-174	Sandstone, tan-lt. gray, very shelly, lithified better than above, very porous.
174-184	Sandstone, gray, medium hard, less shell, medium porosity.

(Con't.)

Table A-4 (Con't.). Geologist's Log L-M-926.

De th (ft.)	Description
184-188	Marl, gray, mixture of gray carbonate mud and rock-fragments, slightly phosphatic.
188-195	Clay, green, very silty, phosphatic, same quartz sand.

Table A-5 Geologist's Log L-M-928.

Depth (ft.)	Description
0-3	Sand and sandstone, tan, very hard, crustal sandstone, caliche-like.
3-10	Sand, quartz, brown to yellow, slightly clayey, medium to very fine sand grain size.
10-16	Sandstone, brown to yellow, clayey, hard, clay fills small voids, low porosity.
16-24	Sandstone and limestone, gray, quartz sand cemented by varying percentages of carbonate, minor quantity of shell fragments.
24-34	Limestone, lt. gray, very hard, and shell, interbedded (sandstone frags. - from above), shells are very small (3-5 mm maximum diameter).
34-44	Limestone, gray, sandy, very hard; interbedded with medium-size shell fragments , extremely high overall porosity.
44-54	Limesotne, lt. tan, medium hard, with interbedded shell.
54-64	Limestone, dark gray, very hard, phosphatic, some interbedded shell, but less than above.
64-74	Limestone, gray, medium hard some phosphate, thick beds of shall (very finely broken).
74-84	Limestone, gray, medium hard to soft, pockets of quartz sand (probably filled solution cavities).
84-94	Limestone, gray, very hard, phosphate nodules, medium porosity - vugged, some large fossil shells.
94-104	Limestone, gray, medium hard, some shell and quartz sand.

(Con't.)

Table A-5 (Con't.). Geologist's Log L-M-928.

Depth (ft.)	Description
104-114	Limestone, gray to lt. tan, several different colored lithologies, medium hard, some coralline limestone.
114-124	Limestone, gray to lt. gray, similar to above, small vugs.
124-134	Limestone, lt. gray, tightly cemented, medium hard, shell cemented within.
134-138	Limestone, lt. gray to lt. tan, same as above, soft.
138-140	Clay, brown-gray, silty, (no sample).
140-144	Clay, gray-green, carbonate mud, with a high percentage of quartz silt (poor sample).
144-154	Clay, green, less silt than above, fat, commonly called "blue clay".
154-164	Clay, green, very fine grain-size, low percentage of silt, very tight.
164-168	Clay, green, carbonate mud with impurities, same generally as above.
168-184	Limestone, light gray, medium hard, small vugs, high porosity.
184-191	Limestone, light gray, medium hard, some shell.
191-200	Sandstone, tan-gray, medium hard, medium porosity.
200-204	Sandstone, gray-tan, same as above (no sample).
204-214	Sandstone, light gray to light tan, medium hard, some cemented shell fragments (Chlamys sp.).
214-224	Sandstone, lt. gray, soft, disseminate shell fragments, carbonate cement loose particularly at base.

(Con't.)

Table A-5 (Con't.). Geologist's Log L-M-928.

Depth (ft.)	Description
224-226	Clay, lt. green-gray, carbonate mud, phosphatic.
226-235	Clay, green, shell fragments, some sandstone fragments.
235-240	Marl, gray, mixture of carbonate mud, quartz silt, rock fragments, and shell, some phosphate nodules.
240-244	Limestone, lt. gray, sandy, medium porosity, some shell.
244-250	Sandstone, lt. gray, very fine sand cemented by well-lithified carbonate.
250-264	Sandstone, gray-tan, phosphatic, some carbonate mud.

Table A-6. Geologist's Log L-M-929.

Depth (ft.)	Description
0-3	Sand, quartz, white to lt. gray (no sample).
3-6	Sand, gray-brown, 2-4% clay, high percentage of quartz silt, low porosity.
6-12	Sandstone, lt. tan to brown, and brown clay, soft interbedded sequence, abundant quartz silt, low porosity.
12-16	Sandstone, lt. gray, quartz sand and silt cemanted by 1-3% carbonate, medium hard to soft.
16-24	Limestone, tan to lt. gray, medium hard, sandy, water loss zone - high permeability.
24-34	Sandstone, lt. gray, and sandy limestone, variable percentages of quartz sand and carbonate cemant, shell fragments.
34-44	Sandstone, lt. gray, and shell, small fragments and whole shell, Chione cancellata, interbedded sequence.
44-48	Sandstone and shell, lt. gray, interbedded medium hard sandstone and unconsolidated shell hash.
48-58	Limestone, shell, and sand, interbedded sequence, sand and shell beds are unconsolidated, highly permeable zone.
58-64	Limestone, dark gray, slightly phosphatic, very hard.
64-70	Limestone, dark gray, same as above, appears to be slightly sandy, phosphatized shell fragments.
70-80	Limestone, gray, medium hard to hard, vugged , high porosity.
80-94	Limestone and sandstone, lt. gray to tan, hard, entire sequence sandy, hard.

(Con t.)

Table A-6 (Con't.). Geologist's Log L-M-929.

Depth (ft.)	Description
94-104	Limestone, lt. gray and gray, chalky texture, shell fragments, medium hard to soft, low porosity.
104-114	Limestone, gray, hard, fairly clean, some shell fragments, small vugs, medium to high porosity.
114-124	Limestone, tan to gray, medium hard, less shell than above.
124-130	Limestone, same as above (no sample).
130-137	Clay, gray, some shell and rock fragments, quartz silt and some sand.
137-154	Clay, green, variable color from very dark to nearly olive, dark clay has abundant micro-fossils, some quartz silt, barnacles.
154-180	Clay, green, same as above, quite silty, (poor sample).
180-194	Limestone, gray-tan, medium hard, high porosity, little if any sand, some shell (1-2%).
194-204	Limestone, lt. tan to cream, medium hard to soft, high porosity.
204-208	Sandstone, tan, medium hard, very fine quartz sand cemented by carbonate.
208-224	Sandstone, gray-tan, soft, some shell and echinoid spines, slightly clayey (gray carbonate mud).
224-240	Sandstone, gray-tan, soft, same generally as above.
240-244	Marl, green, mixture of green carbonate mud, shell, rock gragments, and some phosphorite.
244-255	Sand and shell, with green carbonate mud, some sandstone, interbedded, phosphatic, higher porosity than above.

(Con't.)

Table A-6(Con't.). Geologist's Log L-M-929.

Depth (ft.)	Description
255-260	Sandstone, gray, soft, high percentage of loosely consolidated quartz sand and shell, some phosphorite.
260-264	Sandstone, gray, medium hard, trace of shell, medium porosity.
264-274	Sandstone, gray, clayey, soft, poorly lithified, low porosity.
274-284	Marl, gray, interbedded and mixed gray carbonate mud, quartz sand and silt, shell, and rock fragments.

Table A-7. Geologist's Log L-M- 931.

Depth (ft.)	Description
0-1	Sand, quartz, medium to very fine grain.
1-3	Sandstone, brown, medium hard, very fine quartz sand cemented by carbonate.
3-8	Clay, sandy, yellow-brown, quartz silt abundant, shelly, 20-25% clay.
8-24	Clay, dark gray, quartz sand and silt +50%, shelly, mixture of separate lithologies.
24-34	Sandstone, lt. tan to cream, hard, some shell, very fine quartz sand tightly cemented by carbonate.
34-44	Sandstone, gray-tan, hard, some shell, similar to above.
44-54	Sandstone, gray, and bedded shell hash, medium hard.
54-59	Limestone, lt. gray, and shell, hard to medium hard.
59-64	Limestone, dark gray, sandy, very hard, some phosphate.
64-69	Limestone, dark gray and gray, with some micro-crystalline limestone or dolomite (chert like appearance), very hard.
69-78	Limestone, lt. gray, medium hard, quite porous.
78-84	Limestone, lt. tan, soft, corals and fine shell hash, apparent reef material.
84-94	Limestone, lt. tan and gray, with shell hash, bryzoans common, soft.
94-104	Limestone, lt. tan and gray, same as above, apparent reef material.
104-116	Limestone, tan, medium hard, vugged, quite porous.

(Con't.)

Table A-7 (Con't.). Geologist's Log L-M-931.

Depth (ft.)	Description
116-124	Limestone, lt. tan and gray, soft, similar to 94-104.
124-134	Limestone, tan and lt. gray, medium hard, shell fragments.
134-144	Limestone, lt. tan to cream, medium hard, molds of burrows, very porous.
144-156	Limestone, lt. gray, medium hard, some shell.
156-162	Marl, gray, quartz silt with carbonate mud, and rock fragments.
162-164	Clay, green, high percentage of quartz silt and sand.
164-174	Clay, green-gray, carbonate mud with silt and some shell, fat.
174-184	Clay, green, carbonate mud and quartz silt, earthy texture.
184-194	Clay, green, carbonate mud, less silt than above.
194-204	Clay, green, dark green at base, darker carbonate mud contains abundant foraminifera.
204-212	Limestone, lt. gray-tan, meidum hard, very little if any quartz sand.
212-224	Limestone, lt. gray to gray, some shell fragments, Anomia sp, some molds and casts, some quartz sand.
224-234	Sandstone, tan, very fine quartz sand cemented by carbonate, shelly.
234-244	Sandstone, tan, very fine quartz sand +60%, shell fragments, Chlamys sp., softer than above.
244-258	Sand and shell, unconsolidated (no sample).

(Con't.)

Table A-7 (Con't.). Geologist's Log L-M-931.

Depth (ft.)	Description
258-262	Marl, carbonate mud, gray, with limestone fragments and some very fine quartz sand.
262-264	Marl, same as above, with thin laminae of consolidated limestone.
264-274	Sandstone, thin shell fragments and quartz sand very loosely cemented.
274-278	Sandstone, tan-gray, medium hard, some phosphorite and shell.
278-284	Limestone, gray, hard, sandy, with minor interbedded green clay.
284-290	Sand, gray, with quartz silt and some carbonate mud.
290-294	Clay, gray, carbonate mud with quartz silt (poor sample).
294-304	Clay, green, very silty and sandy (poor sample).

Table A-8. Geologist's Log L-M-933.

Depth (ft.)	Description
0-12	No samples - sand and clayey sand.
12-17	Sandstone, lt. tan to tan, with sandy limestone, hard, very porous, spary-calcite cement.
17-24	Limestone, lt. tan to lt. gray, sandy, shell fragments, hard.
24-30	Shell and limestone, lt. tan, small shells interbedded with thin limestone beds, soft.
30-34	Limestone, lt. tan; and sandstone, gray, with thin, interbedded shell, large whole shells and fragments, Chione cancellata, Turritella sp., hard and soft.
34-44	Shell and sandstone, lt. tan, whole shells apparent Pleistocene complex, probable interbedded sequence.
44-49	Shell, very finely broken, shell hash, some very thin laminae of tan carbonate mud and limestone.
49-54	Limestone, gray, and sandstone, lt. brown, hard, very fine quartz sand cemented by carbonate.
54-64	Limestone, dark gray, hard, some quartz sand and micro-phosphorite nodules cemented within.
64-74	Limestone, gray, lt. gray, and lt. tan, coral fragments, medium hard to soft.
74-84	Limestone, lt. gray, with some disseminate tan shell fragments, medium hard to soft.
84-94	Limestone, lt. tan, some burrow casts, medium soft, some fragments of dark, phosphatic limestone.
94-104	Limestone, gray and lt. gray, slightly phosphatic, very porous, med. hard.

(Con't.)

Table A-8 (Con't.). Geologist's Log L-M-933.

Depth (ft.)	Description
104-124	Limestone, lt. gray and tan, sponge-like texture, medium hard, very porous.
124-134	Limestone, lt. tan, similar to above, very porous.
134-144	Limestone, lt. tan, very pure $CaCO_3$ compared to the overall sequence, very porous.
144-154	Limestone, lt. gray, soft, slightly marly, shelly, not as well consolidated as sequence above, phosphatic limestone nodules.
154-164	Clay, green, large quantities of quartz silt, rock and shell fragments, could be termed marl.
164-174	Clay, green, quartz silt and sand +35%, clay is really a carbonate mud.
174-184	Clay, green, some silt but less than above, a few shell and rock fragments, fairly dense.
184-196	Clay, green, darker than above, dense, fat, less silt.
196-204	Limestone, gray and yellow, appears weathered, medium hard to soft.
204-214	Limestone, gray, cemented carbonate fragments, shells and pellete, porous.
214-224	Sandstone, lt. tan, very fine quartz sand cemented by carbonate, sand% quite variable, soft to medium hard.
224-234	Sandstone, lt. tan, higher percentage of sand than above, increased quantity of shell fragments.
234-244	Sandstone, tan-gray, beds of poorly lithified sand and carbonate mud inter-bedded with medium hard sandstone and laminae of green clay.

(Con't.)

Table A-8 (Con't.). Geologist's Log L-M-933.

Depth (ft.)	Description
244-249	Sandstone, quartz sand, and mud, interbedded and mixed, shelly, soft, low porosity.
249-259	Sandstone, "dirty", shell fragments, some carbonate mud 2-5%, and some medium hard lt. gray sandstone, overall gray-tan color.
259-264	Sandstone, lt. tan to lt. gray, well consolidated, better water producer than above.
264-284	Sandstone, gray-tan, soft, quartz sand and some mud, low overall porosity, phosphatic.
284-289	Sandstone, gray, increasing percentage of fines with depth, slightly clayey (gray).
289-304	Marl, interbedded and disparite gray carbonate mud, quartz sand and silt and shell.

Table A-9. Geologist's Log L-M-934.

Depth (ft.)	Description
0-12	Sand, tan, quartz (0-5), clayey sand yellow-brown (5-12) no sample.
12-17	Sandstone, lt. brown, medium hard, some shell, very fine quartz sand cemented with carbonate.
17-24	Limestone and shell, unconsolidated, bedded shell interbedded with cream to tan sandy limestone, soft, very porous.
24-40	Shell and sand, rock fragments (no sample).
40-45	Sandstone, brown to lt.brown, soft to medium hard, very fine quartz sand cemented by carbonate.
45-50	Limestone, lt. gray, with interbedded shell hash, very porous.
50-57	Limestone, same as above and dark gray sandy limestone, abundant shell fragments.
57-62	Sandstone, dark gray, very hard, phosphatic, appears to be an anoxic carbonate.
62-65	Sandstone, gray, medium to very hard, some shell fragments, trace of phosphorite.
65-70	Limestone, gray, very hard, nearly pure carbonate, only trace of very fine quartz sand.
70-77	Limestone, lt. gray, medium hard, vugged, very porous.
77-79	Limestone, brown, appears like chert, low porosity, hard, colloidal fractures.
79-83	Limestone, gray to lt. gray, coralline, reef complex, very high porosity.
83-88	Limestone, lt. gray and lt. tan, slightly clayey, some poorly consolidated carbonate mud, shell fragments (large fossils).

(Con't.)

Table A-9 (Con't.). Geologist's Log L-M-934.

Depth (ft.)	Description
88-98	Limestone, lt. gray, medium hard, shell and small shell fragments, medium to high porosity.
98-105	Limestone, lt. gray to white, chalky texture, shelly, soft, low porosity.
105-115	Limestone, tan, medium hard, very porous, small vugs.
115-125	Limestone, tan, medium hard, same as above.
125-132	Limestone, tan to lt. gray, medium hard to soft, vugged, apparent higher porosity than above.
132-145	Limestone, white to lt. gray, medium hard, high porosity, bryzoan fragments.
145-154	Limestone, tan, medium hard, interbedded with small shell beds.
154-156	Clay, lt. green-gray, very silty, weathered rock fragments, some barnacle fragments, greener toward base.
156-160	Marl, soft, lt. gray to gray, mixture of carbonate mud, shell, quartz silt, and some limestone (both fragments and bedded).
160-185	Clay, green, carbonate mud, quartz silt and sand +25%, shell fragments, phosphate nodules.
185-202	Clay, dark green, less silt than above, dense, phosphatic, micro-fossils, dark olive green near base.
202-205	Limestone, lt. gray, clean, little if any quartz sand, medium hard.
205-218	Limestone, lt. gray, some sandstone or sandy limestone toward base, soft to medium hard.

(Con't.)

Table A-9 (Con't.). Geologist's Log L-M-934.

Depth (ft.)	Description
218-225	Limestone, gray, slightly clayey, soft, lower porosity than above.
225-235	Sandstone, tan, soft, very fine quartz sand cemented by carbonate, bryzoan fragments.
235-245	Sandstone, tan, soft, shelly, thin shell fragments of Chlamys sp. (?).
245-255	Sandstone, tan, very shelly, +35%, phosphatic, soft.
255-265	Sandstone, gray, soft, very fine quartz sand cemented by carbonate with some loosely consolidated carbonate mud, overall low porosity.
265-275	Sandstone, gray-tan, harder than above, phosphatic, medium porosity.
275-285	Sandstone, gray-tan, and limestone, lt. gray, interbedded, medium hard, some shell, medium porosity.
285-290	Sandstone, gray, very silty, phosphatic, low porosity, shell fragments abundant.
290-305	Marl, gray-green, mixture of carbonate mud and silt, quartz silt, rock fragments, shell, and some minor phosphate.

Table A-10. Geologist's Log L-M-936.

Depth (ft.)	Description
0-6	Sand, quartz, very fine, tan, clean.
6-13	Sand, tan-gray, clayey (3-8%).
13-20	Shell and sandstone, loose, unconsolidated sandstone occurs as fragments only, Pleistocene shell complex.
20-23	Limestone and shell, loosely cemented, moderate-size shells.
23-25	Limestone, brown and white, very hard, sandy, (shell in sample from above).
25-36	Shell, large fragments, unconsolidated, limestone fragments.
36-44	Sandstone, tan, very hard, some shell, very fine quartz sand cemented by carbonate.
44-50	Limestone and shell, interbedded, whole fossil shells, medium overall hardness, very high porosity.
50-64	Limestone, gray, medium hard, cemented shell, interbedded lt. gray, soft, porous limestone.
64-69	Limestone, lt. tan, soft, shelly, very porous.
69-74	Limestone, gray, some shell, phosphatic, shell material vugged and weathered.
74-79	Limestone, gray, and partially consolidated, bedded shell, soft, very porous.
79-84	Limestone, lt. gray, very porous, sponge-like appearance, medium hard, some shell.
84-104	Limestone, lt. gray to gray-tan, same as above, with thin beds of micro-crystalline dolomite, sandy.
104-114	Limestone, tan to buff, sandy, medium hard.

(Con't.)

Table A-10 (Con't.). Geologist's Log L-M-936.

Depth (ft.)	Description
114-120	Limestone, lt. tan to cream, some coral fragments, and shell.
120-124	Marl, lt. gray, mixture of carbonate mud, shell, and rock fragments.
124-132	Clay, green, quartz sand and silt, (poor sample).
132-144	Clay, green, fat, fairly pure carbonate mud with minor quartz silt.
144-154	Clay, green, lighter color than above, higher percentage of quartz silt than above, some phosphate nodules.
154-164	Clay, green, interbedded lt. green and dark green beds, mostly carbonate.
164-176	Clay, green, tight, mostly carbonate similar to above.
176-184	Limestone, lt. gray, nearly devoid of quartz sand, some shell fragments.
184-192	Limestone, lt. gray and lt. tan, cemented carbonate sand and shell.
192-194	Limestone and sandstone, lt. tan, sand percent increases with depth, medium hard to soft.
194-204	Sandstone, lt. tan, medium hard, very fine quartz sand cemented tightly by carbonate, some shell.
204-214	Sandstone, lt. tan, with minor interbedded loose quartz sand, percentage of quartz sand increases with depth.
214-224	Sandstone, sand, and shell, loosely cemented, nearly unconsolidated.
224-230	Sandstone, sand, and shell, same as above.
230-234	Marl, mixture of brown-green carbonate mud, phosphorite nodules, shell, and lt. tan sandstone fragments.

(Con't.)

Table A-10(Con't.). Geologist's Log L-M-936.

Depth (ft.)	Description
234-238	Sandstone, lt. gray, medium hard, well cemented.
238-242	Sandstone or sandy limestone, gray, medium hard.
242-266	Marl, mixture of brown-green carbonate mud, tan sandstone fragments, and shell, probably several interbedded distinctive lithologies.
266-274	Sandstone, gray sandy, some shell and clay, another complex lithologic sequence.
274-284	Sandstone, gray, hard, interbedded with clay.

Table A-11. Geologist's Log L-M-938.

Depth (ft.)	Description
0-5	Sand, tan to brown, quartz, very fine, some silt and clay.
5-15	Clay, gray, sandy, thin beds of brown and lt. gray sandstone, poor permeability.
15-20	Sandstone and sand, clayey, poorly consolidated, mixed lithology, could be termed "marl".
20-25	Limestone, gray, fairly soft, clayey, poor permeability.
25-32	Limestone and shell, whole and fragmented shell in a loose matrix of primary micrite, soft.
32-36	Sandstone, buff, medium hard, some thin beds of hard lt. brown sandstone, some shell.
36-42	Limestone, buff to light gray, sandy, nearly a carbonate cemented siltstone with quartz sand, shell fragments.
42-45	Shell, whole and fragmented Chione cancellata, apparent Pleistocene assemblege.
45-50	Shell, with lt. gray limestone, same generally as above.
50-55	Sandstone, gray, very hard, cemented shell fragments, phosphatic.
55-65	Limestone, light gray, hard, sandy, some molds and casts.
65-70	Limestone, gray, hard, darker than above, phosphatic.
70-75	Limestone, light gray, moderately hard, softer than above, moderate to high porosity.
75-85	Limestone, light gray, with coral at base, same as above.

(Con t.)

Table A-11 (Con't/). Geologist's Log L-M-938.

Depth (ft.)	Description
85-95	Limestone, coralline, with shell, apparent reef complex, very high permeability.
95-102	Limestone, gray and tan, very hard, may be dolomitic.
102-105	Limestone, tan, soft, vugged high permeability and porosity.
105-113	Limestone, tan and light gray, soft, high porosity, turbular carbonate secreting organisms.
113-121	Limestone, tan to light gray, moderately hard, high porosity, similar to above.
121-125	Limestone, tan to light gray, chalky texture, shelly, lower porosity than above.
125-132	Limestone, light tan, chalky texture, harder than above, shelly, some quartz sand.
132-138	Marl, limestone fragments imbedded in a gray, carbonate mud matrix, sample does not reflect true lithology.
138-142	Clay, gray-green, sandy and silty, rock fragments and shell.
142-145	Clay, green, quartz silt, some shell, very low permeability.
145-155	Clay, green, pelleted texture, significant percentage of quartz sand and silt.
155-165	Clay, green, with some quartz silt, lower percentage of silt than above.
165-175	Clay, green, lighter color than above, more than 80% carbonate mud, fewer impurities than above.
175-180	Clay, green, same as above.

(Con't.)

Table A-11 (Con't.). Geologist's Log L-M-938.

Depth (ft.)	Description
180-185	Limestone, light gray, moderately hard, high porosity (poor sample - mixed with clay).
185-190	Limestone, light gray, some shell fragments, relatively soft.
190-195	Limestone, light tan, some quartz sand, bryozoan fragments, high porosity.
195-205	Limestone, light tan and gray, hard, cemented shell fragments with secondary carbonate cement.
205-210	Sandstone, light gray, soft, some shell fragments, very fine quartz sand and silt cemented by carbonate.
210-215	Sandstone and shell, lt. gray to lt. green, soft, well-consolidated.
215-220	Sandstone, with shell, same as above.
220-225	Sandstone and shell, some as above.
225-230	Sandstone, with shell, lt. gray, harder than above.
230-235	Sand and shell, very fine quartz sand with shell, abundant quartz silt, lt. gray.
235-241	Sand and shell, same as above, with some beds of consolidated, cemented soft sandstone.
241-245	Silt, quartz, with some green clay, phosphatic, all quartz is very fine.
245-249	Clay, green; silty, some shell fragments, mostly carbonate.
249-252	Sand, very fine, lt. gray (no sample).
252-255	Sandstone, lt. gray, soft, low porosity.
255-262	Sandstone, lt. gray, hard, shell fragments, quartz grains very fine.

(Con't.)

Table A-11(Con't.). Geologist's Log L-M-938.

Depth (ft.)	Description
262-265	Shell and sand, light gray, unconsolidated.
265-277	Same as above.
277-285	Sandstone, lt. gray, clayey.

Table A-12. Geologist's Log L-M-940.

Depth (ft.)	Description
0-3	Sand and clay, brown, peat with mixture of very fine quartz sand and brown clay, some shell fragments.
3-5	Sand (no sample).
5-10	Sandstone, white to lt. gray, medium hard, more than 70% quartz sand.
10-25	Sand, gray, with gray carbonate mud, carbonate mud fraction 10-15%, low permeability.
25-32	Shell, with some carbonate marl and sandstone, interbedded, all small Pleistocene shell.
32-40	Sandstone, lt. gray to gray, hard, some shell, very fine quartz sand cemented tightly by carbonate.
40-44	Shell, slightly cemented in sandstone, high porosity, Chione cancellata.
44-46	Shell (no sample).
46-55	Sandstone, lt. gray to lt. tan, shelly, large and small fragments, Chione cancellata.
55-64	Sandstone, gray, 10-15% quartz sand, light tan sandstone - higher percentage of quartz sand, hard.
64-84	Limestone, gray to dark gray, darker limestone very hard, some shell, very low percentage of quartz sand.
84-96	Limestone, lt. gray and gray, shell, soft, bryzoan fragments.
96-104	Limestone, gray, slightly marly, numerous fossils, Turritella sp., low porosity.
104-116	Limestone, gray, soft, vugged, high porosity, shelly, some interbedded marl.

(Con't.)

Table A-12 (Con't.). Geologist's Log L-M-940.

Depth (ft.)	Description
116-124	Limestone, gray-tan, medium hard, shelly, high porosity.
124-138	Limestone, lt. gray-lt. tan, slightly phosphatic, soft, shelly.
138-144	Limestone, tan to lt. gray, slightly sandy, medium hard to soft, very porous, some molds of burrows.
144-152	Limestone, lt. gray, 3-5% carbonate mud, soft, low porosity, some shell.
152-160	Marl, green, very silty, phosphatic, shell and rock fragments.
160-184	Clay, green, slightly silty, numerous micro-fossils.
184-204	Clay, olive green, slightly silty, lighter color than above.
204-216	Limestone (no sample).
216-224	Limestone, gray, medium hard, medium porosity, bryzoan fragments.
224-244	Sandstone, tan, soft, very fine quartz sand cemented by carbonate, slightly phosphatic.
244-249	Sandstone, tan, with interbedded shell fragments and quartz sand.
249-259	Sandstone, tan, soft, with high percentage of shell fragments.
259-264	Sandstone, lt. gray, medium hard, lower percentage of shell fragments than above.
264-269	Sandstone, gray, soft, slightly consolidated very fine quartz sand, cemented by carbonate mud, medium to lwo porosity.
269-274	Marl, green, shell fragments and rock fragments in matrix of green carbonate mud.

(on't.)

Table A-12(Con't.). Geologist's Log L-M-940.

Depth (ft.)	Description
274-280	Sandstone, gray, medium hard, with shell.
280-284	Marl, lt. gray, shell, sandstone fragments, and quartz sand with carbonate mud matrix.

APPENDIX B

RAW AQUIFER TEST DATA

Table B-1. Time and drawndown test data for test-production well L-M-924 during the aquifer test of Tamiami Aquifer System - Zone I.

Time (minutes)	Description
0	0
0.5	22.76
1.0	23.46
1.5	23.66
2.0	23.76
2.5	23.76
3.0	24.06
4.0	--
5.0	24.81
10.0	25.16
15.0	25.23
20.0	25.36
30.0	25.55
40.0	25.84
50.0	25.59
60.0	25.56
90.0	25.40
120	25.48
180	25.46
240	24.33
300	24.40
360	24.36
420	24.21
480	24.23
540	24.21
600	24.21
	Stabilized

Table B-2. Time and drawdown test data for observation well L-1985 during the aquifer test of Tamiami Aquifer System - Zone I.

Time (minutes)	Drawdown (feet)
0	0
0.5	0.13
1.0	0.265
1.5	0.35
2.0	0.43
2.5	0.46
3.0	0.48
4.0	0.54
5.0	0.57
10.0	0.65
15.0	0.69
20.0	0.72
30.0	0.74
40.0	0.755
50.0	0.772
60.0	0.795
90.0	0.81
120.0	0.83
180.0	0.855
240.0	0.885
300.0	0.91
360.0	0.925
420.0	0.925
480.0	0.94
540.0	0.942
600.0	0.95
660.0	0.955
720.0	0.96
780.0	0.97
840.0	0.975
900.0	0.995
960.0	1.005
1020.0	1.01
1080.0	1.011
1140.0	1.015
1200.0	1.020
1260.0	1.02
1320.0	1.03
1380.0	1.03

Table B-3. Time and drawdown test data for test-production well L-M-934 during the aquifer test of Tamiami Aquifer System - Zone II.

Time (minutes)	Drawdown (feet)
0.0	0.0
0.5	35.67
1.0	47.67
1.5	48.37
2.0	48.67
2.5	49.17
3.0	49.27
4.0	49.82
5.0	50.22
10.0	52.07
15.0	52.077
20.0	53.27
30.0	54.17
40.0	55.17
50.0	55.67
60.0	56.07
90.0	57.17
120	58.17
180	59.75
240	60.37
300	59.07
360	59.72
420	59.50
480	59.0
540	59.01
600	59.49
660	59.49
720	59.32
780	59.92
840	59.37
900	59.16
960	59.03
1020	58.99
1080	59.02
1140	58.98
1200	59.37
1260	59.67
1320	59.02
1380	60.52
1440	58.99
1500	58.98
1560	59.0
1620	--
1680	59.14
1740	59.32

(Con't.)

Table B-3 (Con't.). Time and drawdown test data for test-production well L-M-934 during the aquifer test of Tamiami Aquifer System - Zone II.

Time (minutes)	Drawdown (feet)
1800	59.01
1860	--
1920	58.99
1980	59.01
2040	58.97
2100	58.99
2160	59.09
2220	59.12
2280	59.11
2340	59.11
2400	59.16
2460	59.30
2520	59.22
2580	59.27

Table B-4. Time and drawdown test data for observation well L-2193 (U.S.G.S.) during the aquifer test of Tamiami Aquifer System - Zone II.

Time (minutes)	Drawdown (feet)
0	0
0.5	0.68
1.0	1.27
1.5	1.80
2.0	2.18
2.5	2.40
3.0	2.74
4.0	3.14
5.0	3.50
10.0	4.61
15.0	5.34
20.0	5.85
30.0	6.60
40.0	7.19
50.0	7.69
60.0	8.13
90.0	9.14
120	10.08
180	11.49
240	12.32
300	13.11
360	13.78
420	14.37
480	14.89
540	15.01
600	15.31
660	15.56
720	16.25
780	16.59
840	--
900	17.18
960	17.24
1020	17.40
1080	17.52
1140	17.55
1200	18.11
1260	18.28
1320	18.38
1380	18.47
1440	18.60
1500	18.74
1560	18.85
1620	--
1680	19.09
1740	19.22

(Con't.)

Table B-4 (Con't.). Time and drawdown test data for observation well L-2193 (U.S.G.S.) during the aquifer test of Tamiami Aquifer System - Zone II.

Time (minutes)	Drawdown (feet)
1800	19.28
1860	19.62
1920	19.78
1980	19.92
2040	20.04
2100	20.15
2160	20.22
2220	20.28
2280	20.34
2340	20.40
2400	20.48
2460	20.58
2520	20.62
2580	20.65
2640	20.71
2700	--

Table B-5. Time and drawdown test data for observation well L-1984 (U.S.G.S.) during the aquifer test of Tamiami Aquifer System - Zone II.

Time (minutes)	Drawdown (feet)
0	0
0.5	0.21
1.0	0.57
1.5	0.87
2.0	1.10
2.5	1.31
3.0	1.50
4.0	1.77
5.0	1.94
10.0	2.99
15.0	3.39
20.0	4.11
30.0	4.76
40.0	5.33
50.0	5.80
60.0	6.17
90.0	7.22
120	7.96
180	9.27
240	10.23
300	10.98
360	11.58
420	12.20
480	12.78
540	13.21
600	13.52
660	13.87
720	14.04
780	14.21
840	14.36
900	14.64
960	14.80
1020	15.04
1080	15.24
1140	15.48
1200	15.63
1260	15.79
1320	15.85
1380	15.98
1440	16.12
1500	16.24
1560	16.33
1620	16.46
1680	16.58
1740	16.78
1800	16.83

(Con't.)

Table B-5 (Con't.). Time and drawdown test data for observation well L-1984 (U.S.G.S.) during the aquifer test of Tamiami Aquifer System - Zone II.

Time (minutes)	Drawdown (feet)
1860	17.02
1920	17.21
1980	17.34
2040	17.44
2100	17.55
2160	17.62
2220	17.66
2280	17.70
2340	17.76
2400	17.83
2460	17.95
2520	17.98
2580	18.03
2640	18.035
2700	18.04

Table B-6. Time and drawdown test data for observation well L-M- 931 during the aquifer test of Tamiami Aquifer System - Zone II.

Time (minutes)	Drawdown (feet)
0.0	0
0.5	0.02
1.0	0.11
1.5	0.22
2.0	0.35
2.5	0.56
3.0	0.61
4.0	0.80
5.0	1.01
10.0	1.80
15.0	2.38
20.0	2.83
30.0	3.51
40.0	4.05
50.0	4.53
60.0	4.96
90.0	5.98
120	6.80
180	8.11
240	9.06
300	9.84
360	10.57
420	11.31
480	11.72
540	12.18
600	12.58
660	12.88
720	13.21
780	13.52
840	13.74
900	13.99
960	14.24
1020	14.49
1080	14.72
1140	14.89
1200	15.08
1260	15.22
1320	15.34
1380	15.44
1440	15.57
1500	15.68
1560	15.80
1620	--
1680	16.04
1740	16.24
1800	16.33

(Con't.)

Table B-6 (Con't.). Time and drawdown test data for observation well L-M-931 during the aquifer test of Tamiami Aquifer System - Zone II.

Time (minutes)	Drawdown (feet)
1860	16.49
1920	16.66
1980	16.78
2040	16.89
2100	17.00
2160	17.08
2220	17.13
2280	17.21
23.40	17.28
2400	17.36
2460	17.40
2520	17.47
2580	17.52

Table 7. Time and drawdown data from outlying wells into Tamiami Aquifer System - Zone II recorded during the aquifer test.

Well Number	Distance from production-test well (ft.)	Time (min.)	Drawdown (ft.)
926	4400	0.0	0.0
		240	0.03
		600	0.20
		1320	0.55
		1830	0.77
		2720	0.92
928	3100	0.0	0.0
		240	0.66
		600	1.80
		1320	3.47
		1830	4.37
		2720	4.69
936	3800	0.0	0.0
		240	0.0
		600	0.24
		1320	0.66
		1830	0.94
		2720	1.22
938	3200	0.0	0.0
		240	0.85
		600	2.37
		1320	4.22
		1830	5.11
		2720	5.59
940	1600	0.0	0.0
		240	2.57
		600	5.20
		1320	7.50
		1830	8.44
		2720	9.05

APPENDIX C

WATER QUALITY ANALYSES

Table C-1 Quality of water in Tamiami Aquifer System - Zone I at the proposed well field site (all values in milligrams/liter, unless otherwise noted).

Well Number	Date Sampled	Silica As SiO_2	Iron (Fe)	Strontium (Sr)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Zinc (Zn)	Manganese (Mn)	Arsenic (As)
925A	11-16	5.2	2.18	0.23	--	--	14.1	--	7.0	32.0	<0.01	0.00	0.01	0.003
925B	11-16	5.4	2.23	0.22	64.0	2.93	13.3	0.30	7.8	32.0	<0.1	0.00	0.01	0.002
927	11-15	5.8	4.99	0.29	65.3	3.76	11.1	0.41	2.5	28.6	<0.1	0.00	0.02	0.002
930	11-15	5.2	5.82	0.34	81.3	3.14	14.8	0.26	2.2	32.5	<0.1	0.00	0.03	0.000
935	11-16	5.4	2.95	0.26	69.1	2.70	12.1	0.45	1.4	26.7	<0.1	0.00	0.00	0.004
937	11-21	5.6	2.17	0.27	74.0	4.10	9.4	0.30	1.2	27.2	<0.1	0.00	0.02	0.009
939	11-21	6.4	0.44	0.30	67.2	6.20	11.4	0.93	1.3	27.2	<0.1	0.00	0.00	0.000

(Con't.)

Table C-1 (Cont'd). Quality of water in Tamiami Aquifer System - Zone I at the proposed well field site (all values in mg/l unless otherwise noted).

Well Number	Date Sampled	Alkalinity		Free CO_2		Hardness				
		Total	Phenolphthalein	Titrimetric	Nomographic	Total	Calcium	Magnesium	Carbonate	Non-carbonate
925A	11-16	230.7	0	41	24	251	236	15	230.7	20.3
925B	11-16	230.7	0	39	29	248	236	12	230.7	17.3
927	11-15	228.0	0	36	26	240	234	6	228	12
930	11-15	308.7	0	97	65	321	321	0	308.7	12.3
935	11-16	246.7	0	57	29	265	251	14	246.7	18.3
937	11-21	241	0	23	31	287.1	235.6	51.5	241	46.1
939	11-21	258	0	29	24	267.3	239.6	27.7	258	9.3

(Con't)

Table C-1 (Cont'd). Quality of water in Tamiami Aquifer System - Zone I at the proposed well field site (all values in mg/l unless otherwise noted).

Well Number	Date Sampled	Cadmium (Cd)	Mercury (Hg)	Chromium (Cr)	Lead (Pb)	Copper (Cu)	Selinium (Se)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Nitrate (NO_3)	Phosphate (K)
925A	11-16	0.00	0.0000	0.00	0.00	0.01	0.02	281	0	<0.01	0.06
925B	11-16	0.00	0.0000	0.00	0.00	0.03	0.00	281	0	<0.01	0.03
927	11-15	0.00	0.0000	0.00	0.00	0.03	0.00	278	0	0.01	0.05
930	11-15	0.00	0.0000	0.00	0.00	0.03	0.02	376	0	0.03	0.04
935	11-16	0.00	0.0000	0.00	0.00	0.00	0.00	301	0	<0.01	0.04
937	11-21	0.00	0.0000	0.00	0.00	0.02	0.00	294	0	<0.01	0.04
939	11-21	0.00	0.0000	0.00	0.00	0.02	0.02	315	0	<0.01	0.07

(Con't.)

Table C-1 (Cont'd). Quality of water in Tamiami Aquifer System - Zone I at the proposed well field site (all values in mg/l. unless otherwise noted).

Well Number	Date Sampled	pH (lab)	Temperature (°C)	Total Dissolved Solids	Color (PCU)	Conductance (μmohs)	Turbidity (NTU)	pHs	Stability Index	Saturation Index	Total Coliform /100 mls	Fecal Coliform /100 mls
925A	11-16	7.25	24.2	360	32	460	4.2	7.12	6.99	0.13	0	0
925B	11-16	7.18	24.2	348	19	460	3.9	7.12	7.06	0.06	0	0
927	11-15	7.20	24.0	352	31	440	9.6	7.14	7.08	0.06	2	0
930	11-15	6.90	24.0	462	38	610	4.6	6.89	6.88	0.01	0	0
935	11-16	7.19	24.8	372	32	462	9.4	7.05	6.91	0.14	2	0
937	11-21	7.15	24.0	388	13	435	6.6	7.13	7.11	0.02	0	0
939	11-21	7.26	24.0	314	32	472	1.2	7.06	6.86	0.20	0	0

Table C-2. Quality of water in Tamiami Aquifer System - Zone II at the proposed well field site (all values in milligrams/liter, unless noted)

Well Number	Date Sampled	Silica as SiO_2	Iron (Fe)	Strontium (Sr)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Zinc (Zn)	Manganese (Mn)	Arsenic (As)
926	11-16	19.4	0.15	0.30	64.7	30.9	35.3	3.2	29.6	37.5	0.37	0.00	0.00	0.002
928	11-16	20.0	0.05	0.34	55.3	32.3	36.7	4.3	35.2	51.4	0.55	0.00	0.00	0.005
931	11-15	19.4	0.10	0.38	51.3	39.9	40.0	4.3	44.8	39.8	0.30	0.00	0.01	0.001
936	11-16	20.1	0.08	0.37	56.2	30.5	41.5	3.3	34.0	36.9	0.36	0.00	0.00	0.004
938	11-21	20.0	0.05	0.22	51.5	27.5	35.0	4.2	29.2	36.9	0.24	0.00	0.01	0.000
940	11-21	14.4	0.10	0.31	70.7	15.7	22.1	3.3	10.4	32.5	0.19	0.00	0.00	0.002

(Con't.)

Table C-2 (Cont'd). Quality of water in Tamiami Aquifer System - Zone II at the proposed well field site (all values in mg/l, unless noted).

Well Number	Date Sampled	Cadmium (Cd)	Mercury (Hg)	Chromium (Cr)	Lead (Pb)	Copper (Cu)	Selinium (Se)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Nitrate (NO_3)	Phosphate (PO_4)
926	11-16	0.00	0.0000	0.00	0.00	0.03	0.00	338	0	<0.01	0.08
928	11-16	0.00	--	0.00	0.00	0.05	0.02	298	0	0.01	0.07
931	11-15	0.00	0.0000	0.00	0.00	0.03	0.00	315	0	<0.01	0.06
936	11-16	0.00	0.0000	0.00	0.00	0.05	0.00	328	0	<0.01	0.16
938	11-21	0.00	0.0000	0.00	0.00	0.04	0.02	307	0	<0.01	0.12
940	11-21	0.00	0.0000	0.00	0.00	0.03	0.02	307	0	<0.01	0.12

(Con't.)

Table C-2 (Cont'd). Quality of water in Tamiami Aquifer System - Zone II at the proposed well field site (all values in mg/l, unless otherwise noted).

Well Number	Date Sampled	Alkalinity		Free CO_2		Hardness				
		Total	Phenolphthalein	Titrimetric	Nomographic	Total	Calcium	Magnesium	Carbonate	Non-carbonate
926	11-16	277	0	38	28	249	214	35	249	0
928	11-16	244.7	0	26	11	210	174	36	210	0
931	11-15	258.7	0	28	15	249	168	81	249	0
936	11-16	268.7	0	29	17	249	192	57	249	0
938	11-21	252	0	21	14	233.6	170.3	63.3	233.6	0
940	11-21	252	0	28	17	233.6	194	39.6	233.6	0

(Con't.)

Table C-2 (Cont'd). Quality of water in Tamiami Aquifer System - Zone II at the proposed well field site (all values in milligrams/liter, unless otherwise noted).

Well Number	Date Sampled	pH (lab)	Temperature (°C)	Total Dissolved Solids	Color (pcu)	Conductance (µmohs)	Turbidity (NTU)	pHs	Stability Index	Saturation Index	Total Coliform /100 mls	Fecal Coliform /100 mls
926	11-16	7.35	26.5	496	16	610	41	7.03	6.17	+0.86	0	0
928	11-16	7.60	26.5	478	--	610	17.5	7.17	6.70	+0.47	0	0
931	11-15	7.50	24.0	460	11	610	5.7	7.24	6.98	+0.26	-	-
936	11-16	7.44	26.5	486	11	600	23	7.47	7.50	-0.03	0	0
938	11-21	7.52	24.0	428	19	500	6.4	7.25	6.98	+0.20	0	0
940	11-21	7.42	26.5	366	14	460	3,5	7.11	6.80	+0.31	0	0

TABLE C-3

FLORIDA DER SAFE DRINKING WATER STANDARDS

A. PRIMARY

Contaminant	Maximum Permissible Level[(a)]
Arsenic	0.05
Barium	1
Cadmium	0.010
Chromium	0.05
Lead	0.05
Mercury	0.002
Nitrate (as N)	10.
Selenium	0.01
Silver	0.05
Fluoride (at 75°F)	1.6
Organics	(b)
Turbidity	(b)
Radionuclides	(b)

B. SECONDARY

Contaminant	Maximum Permissible Level[(a)]
Chloride	250
Color (Color Units)	15
Copper	1.
Stability	Stable
Foaming Agents	0.5
Hydrogen Sulfide	0.05
Iron	0.3
Manganese	0.05
Odor (Threshold Number)	3
Sodium	250
Sulfate	250
Total Dissolved Solids	500
Zinc	5

(a) All values expressed in mg/liter, unless otherwise indicated.

(b) Refer to DER, Chapter 17ER77 for specific contaminants.

APPENDIX D

GEOPHYSICAL LOGS

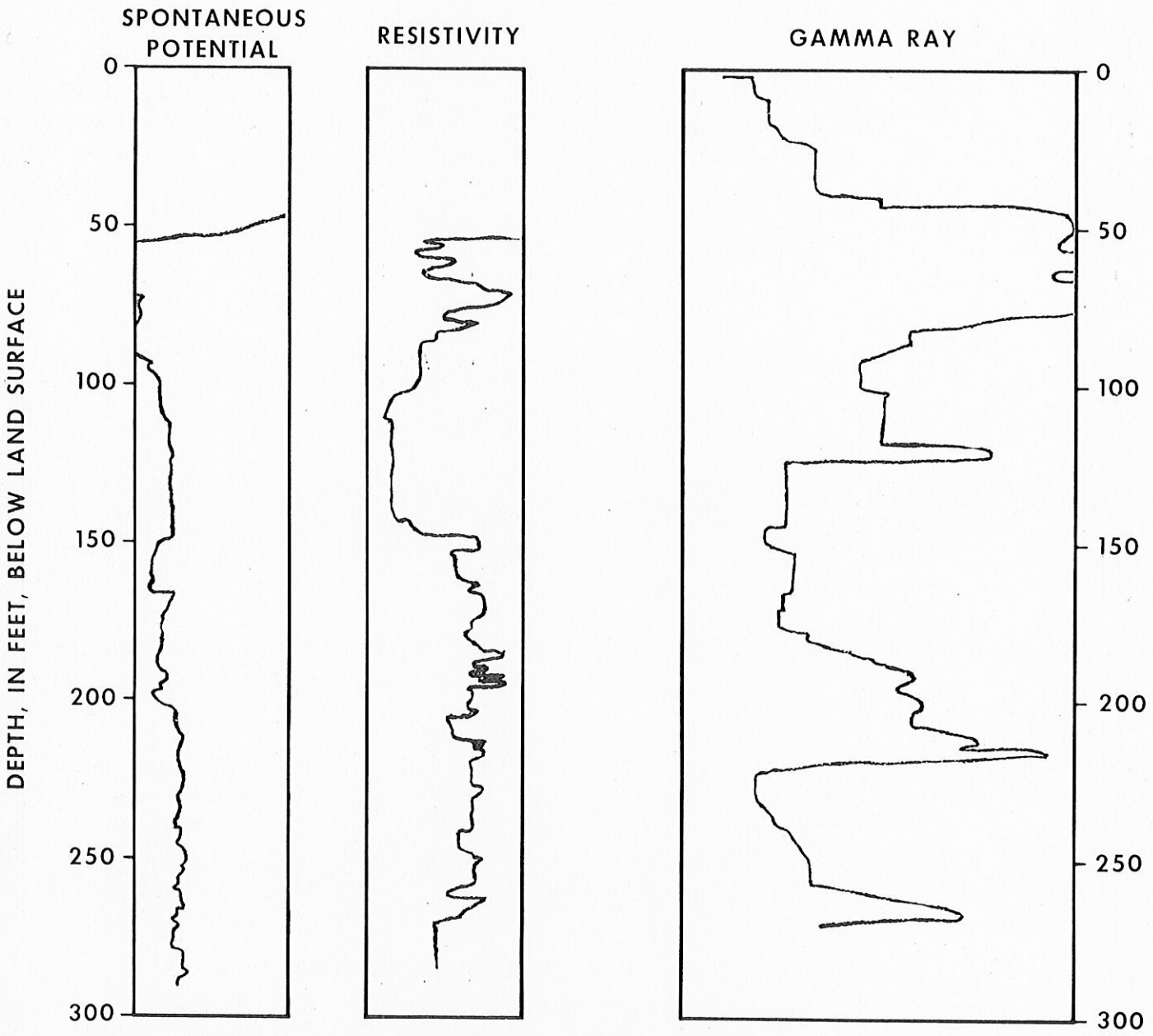

FIGURE D-1 GEOPHYSICAL LOGS-WELL L-M-922

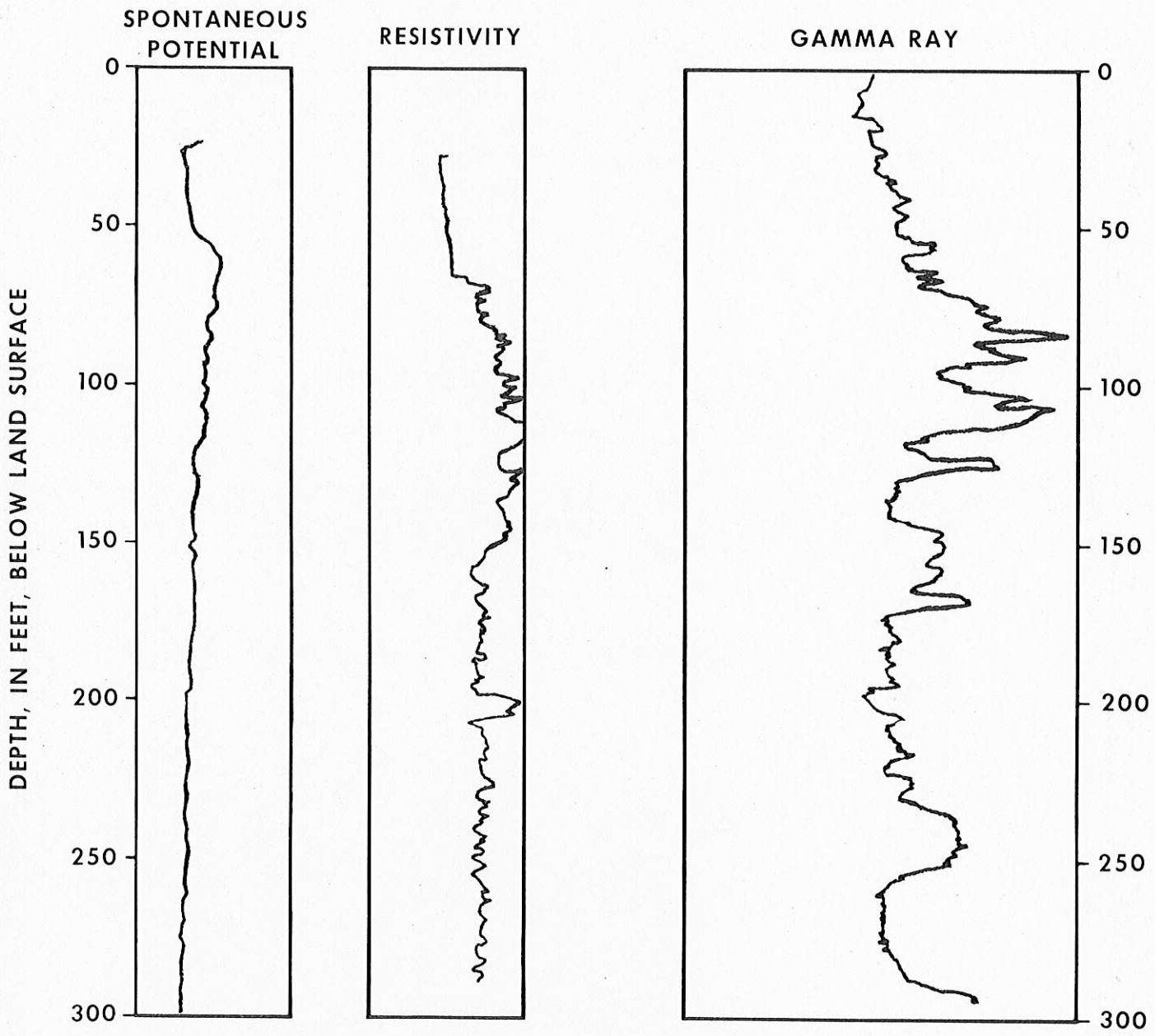

FIGURE D-2 GEOPHYSICAL LOGS-WELL L-M-923

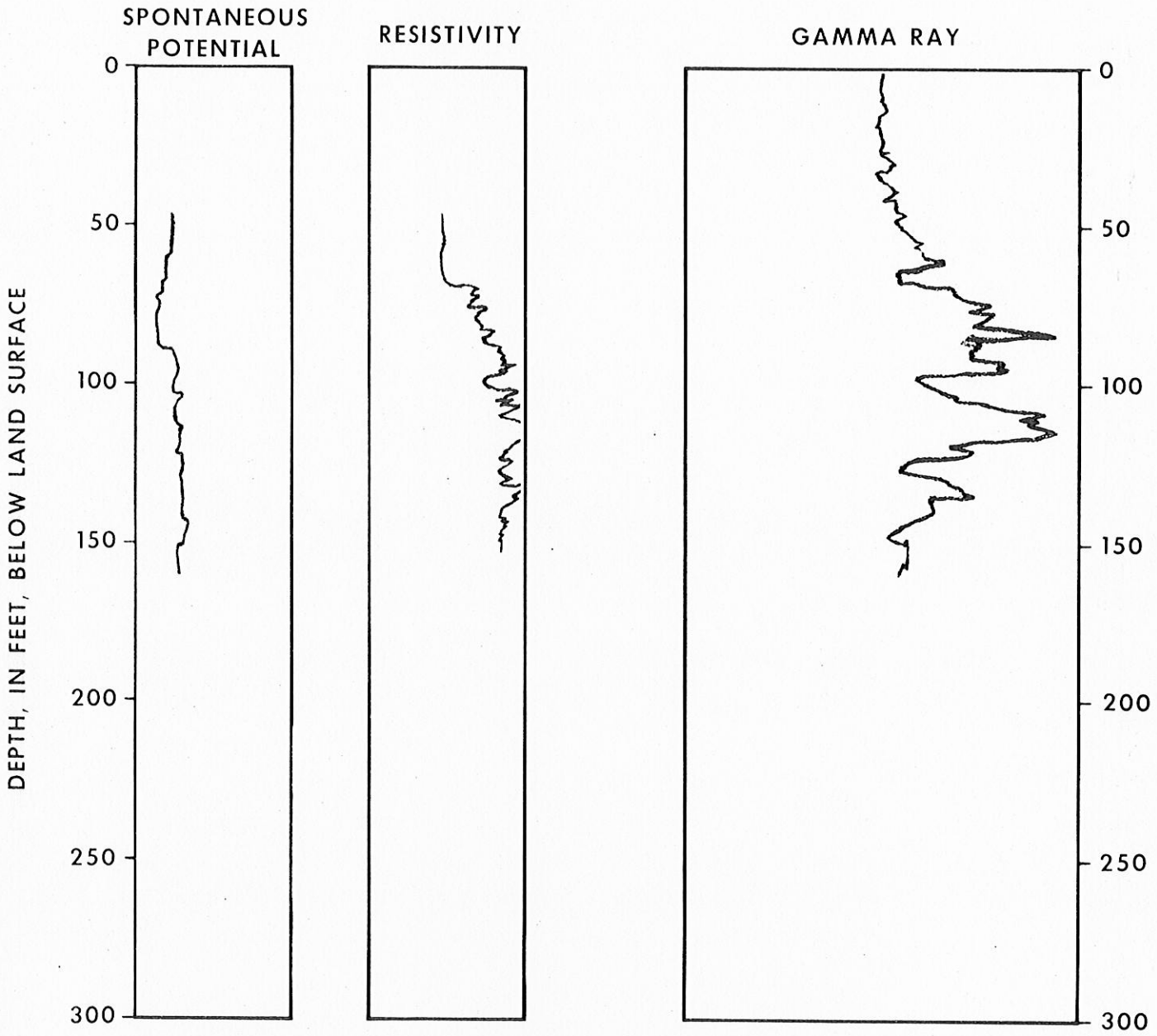

FIGURE D-3 GEOPHYSICAL LOGS-WELL L-M-924

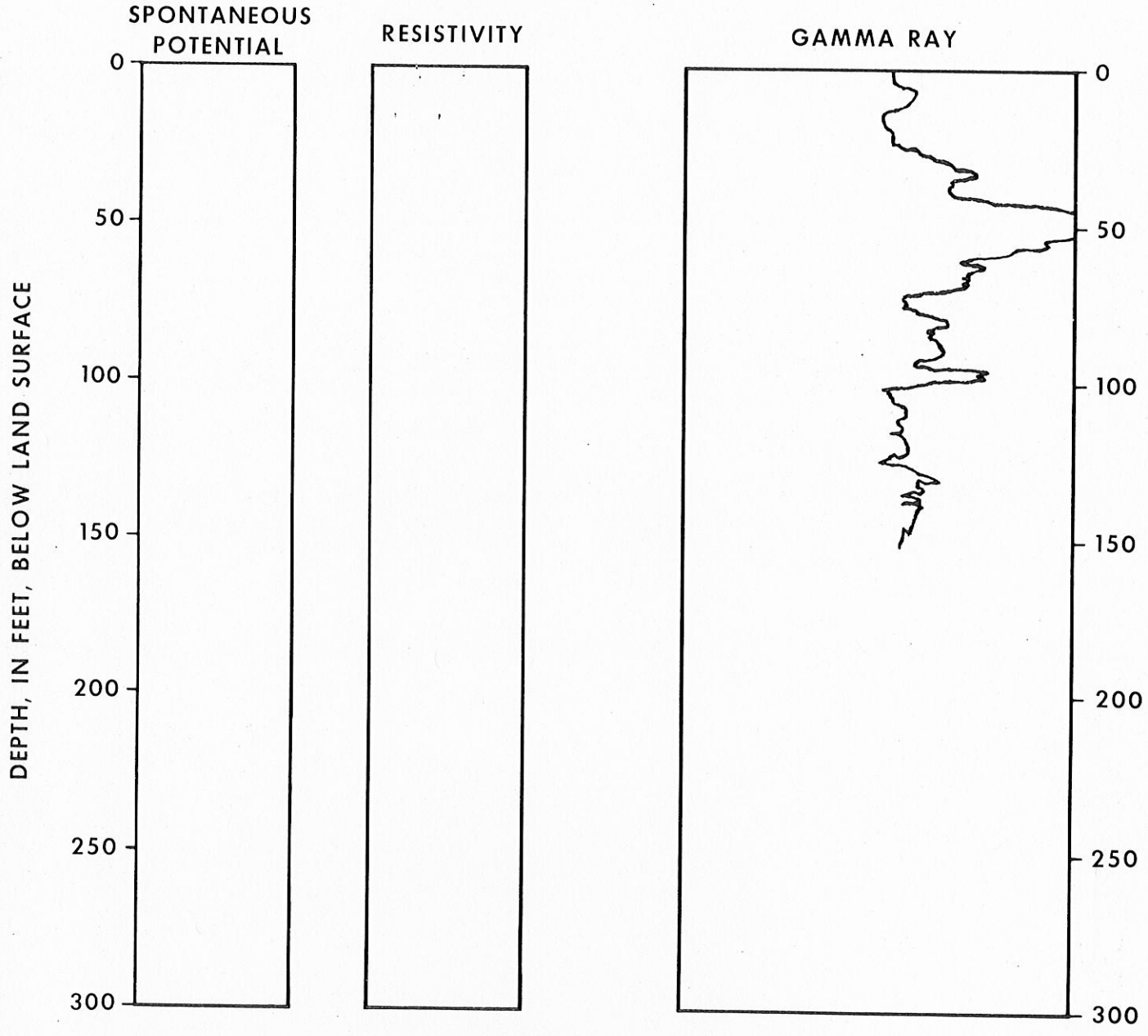

FIGURE D-4 GEOPHYSICAL LOGS-WELL L-M-926

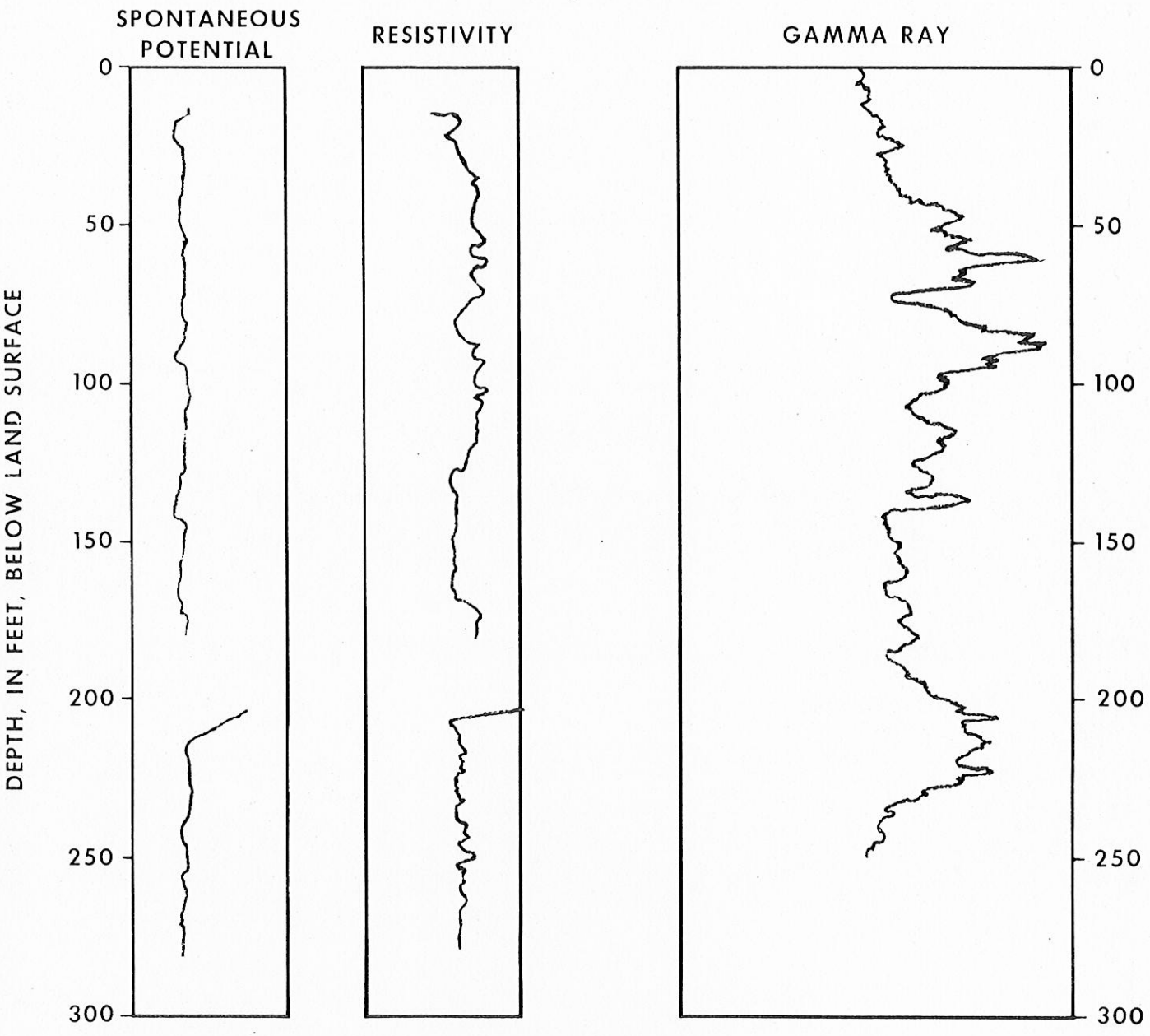

FIGURE D-5 GEOPHYSICAL LOGS-WELL L-M-928

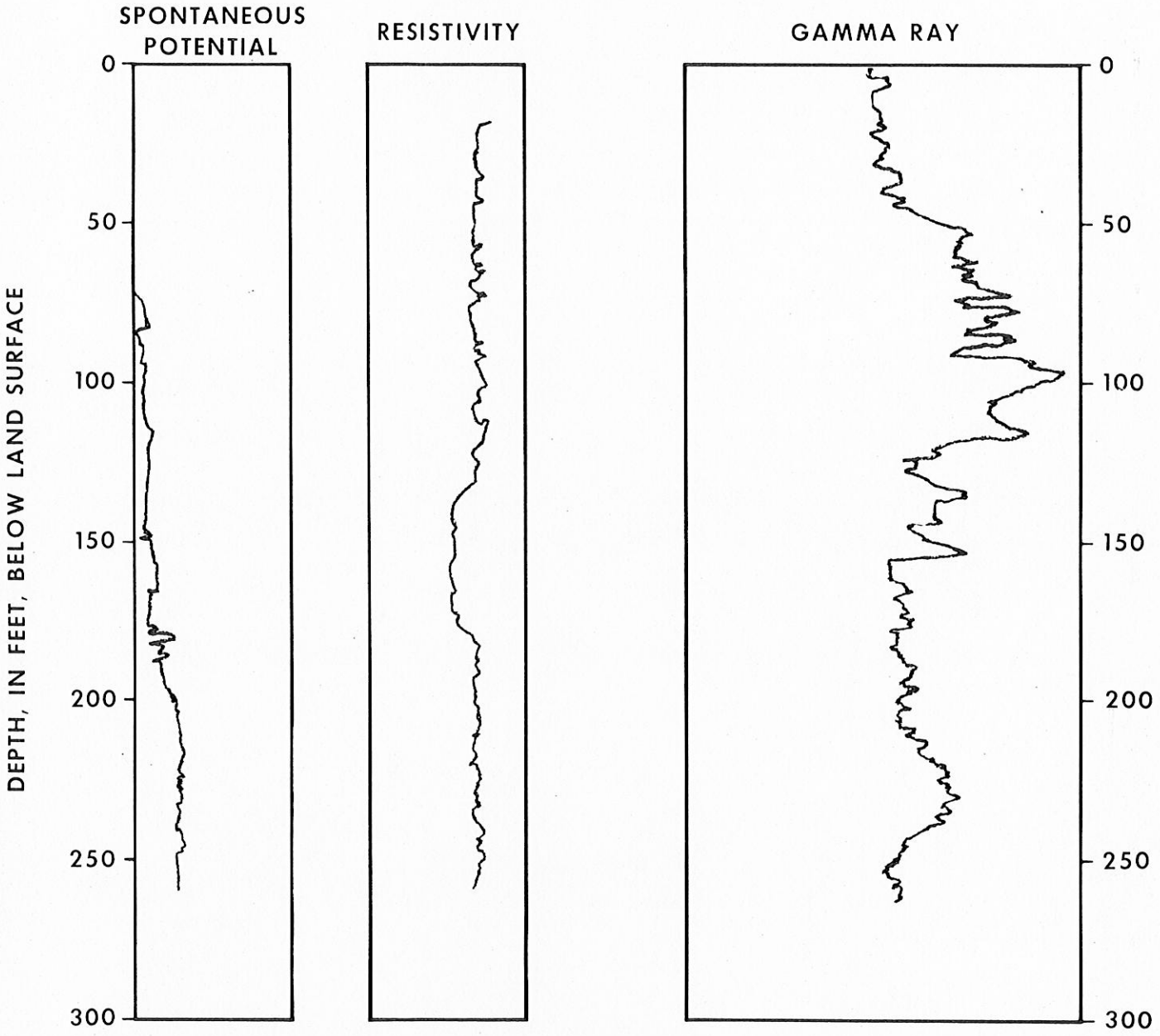

FIGURE D-6 GEOPHYSICAL LOGS-WELL L-M-929

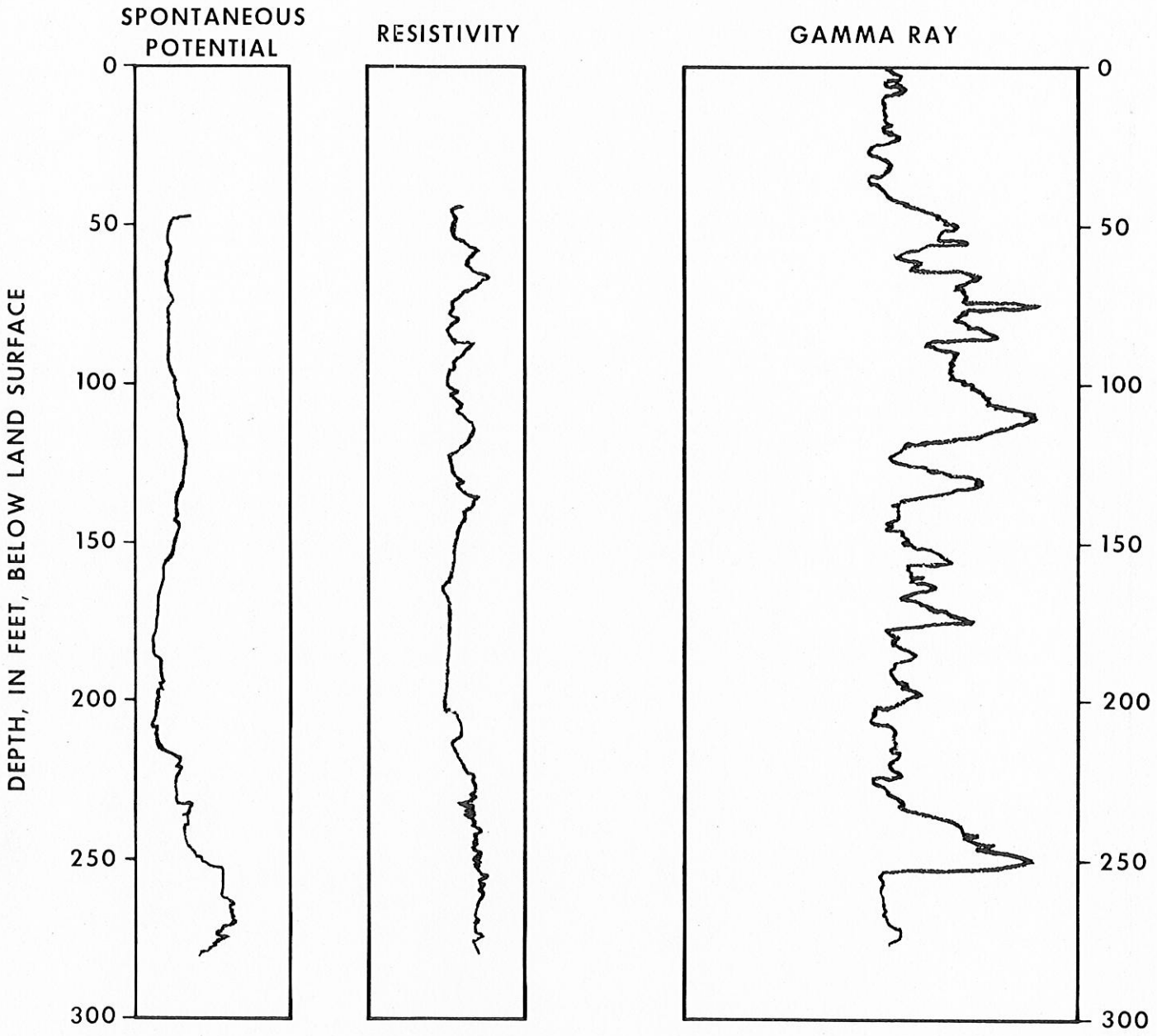

FIGURE D-7 GEOPHYSICAL LOGS-WELL L-M-931

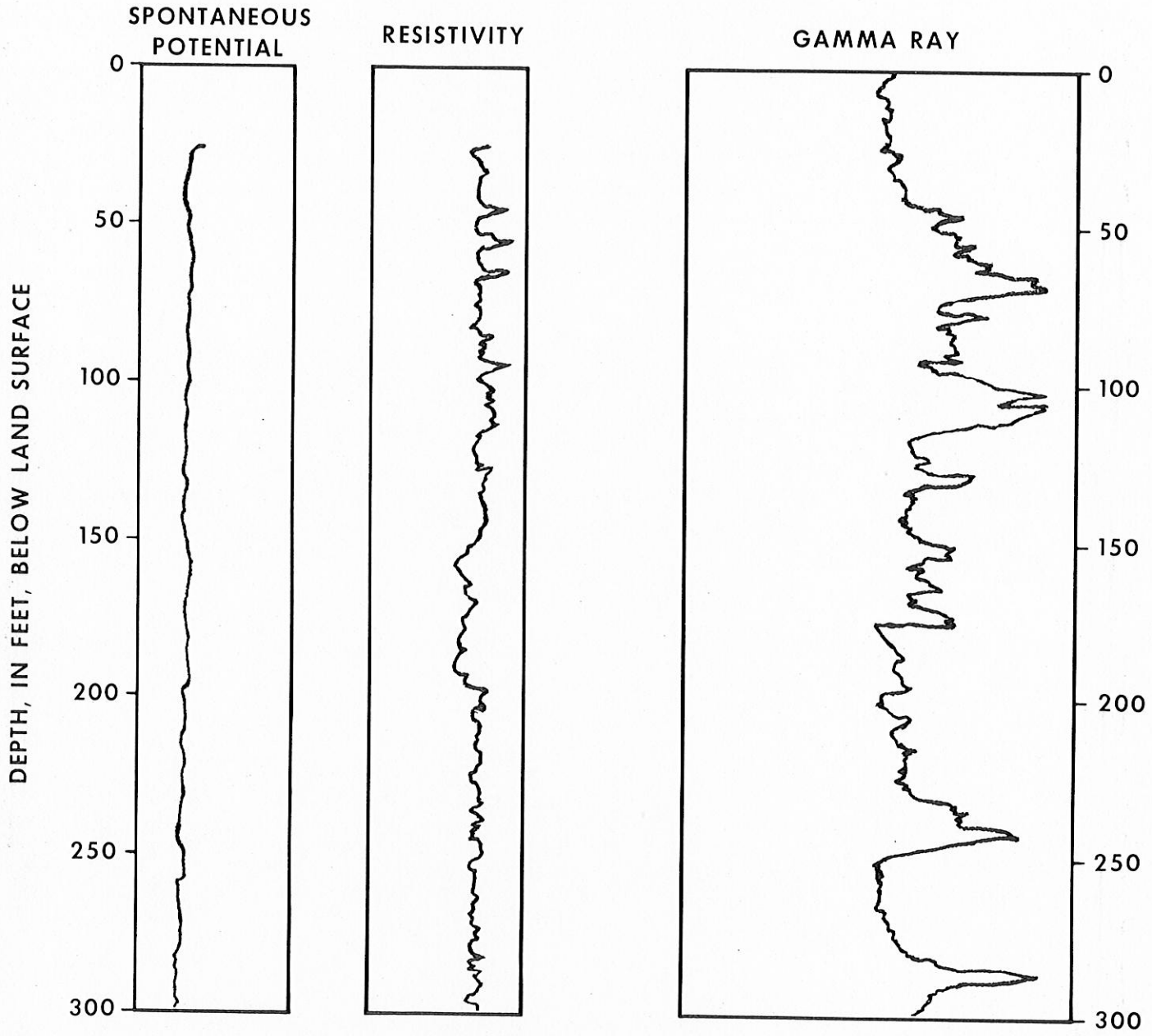

FIGURE D-8 GEOPHYSICAL LOGS-WELL L-M-933

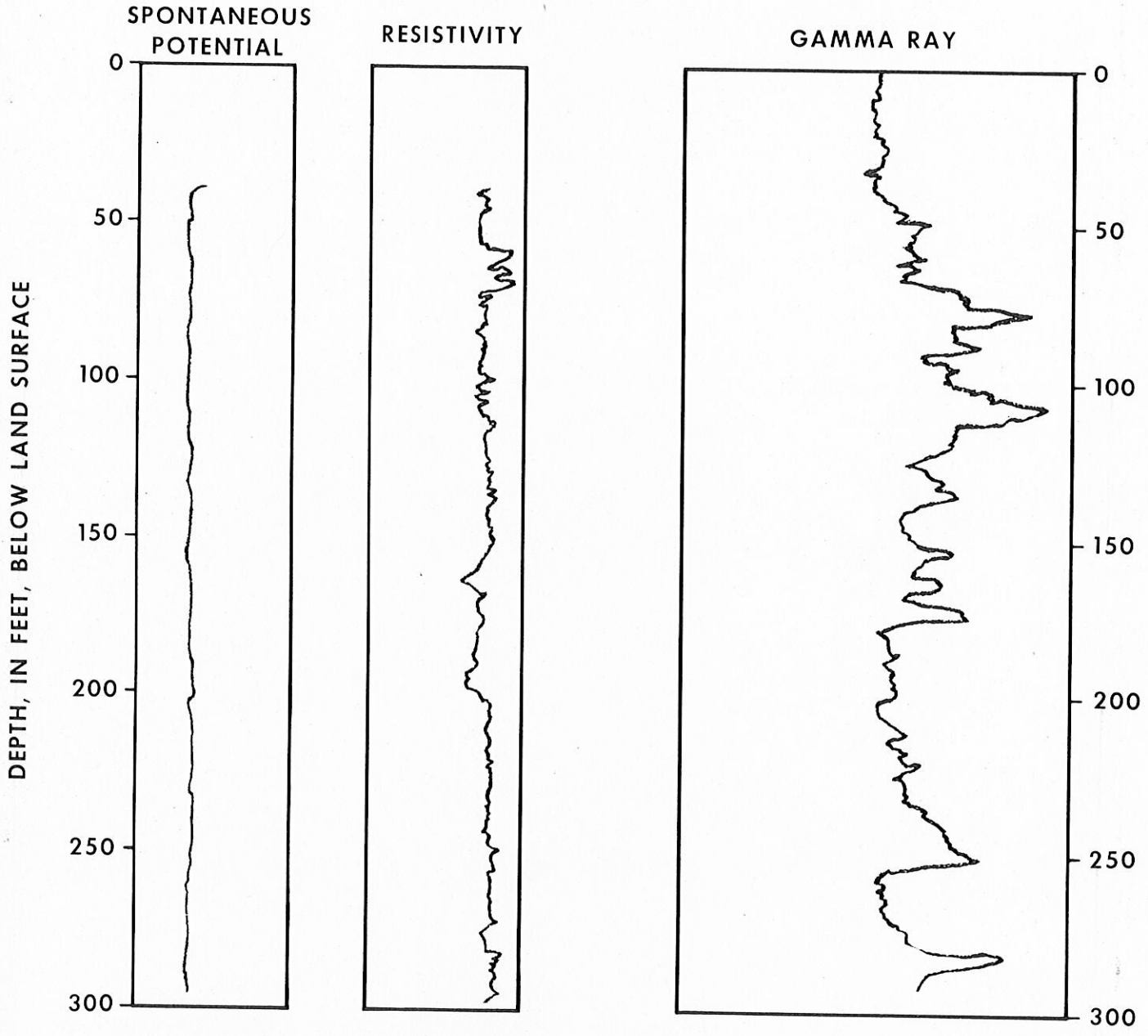

FIGURE D-9 GEOPHYSICAL LOGS-WELL L-M-934

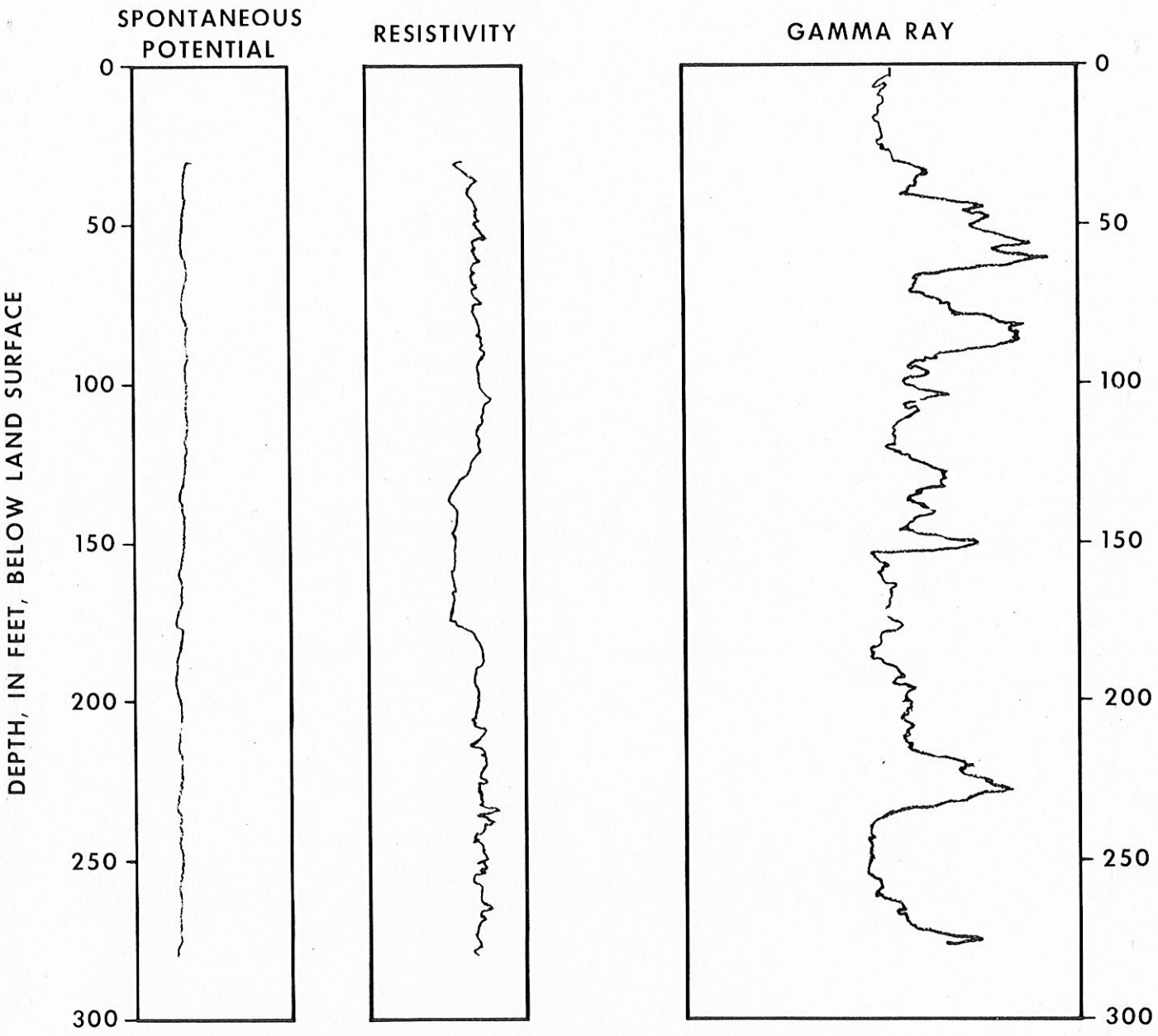

FIGURE D-10 GEOPHYSICAL LOGS-WELL L-M-936

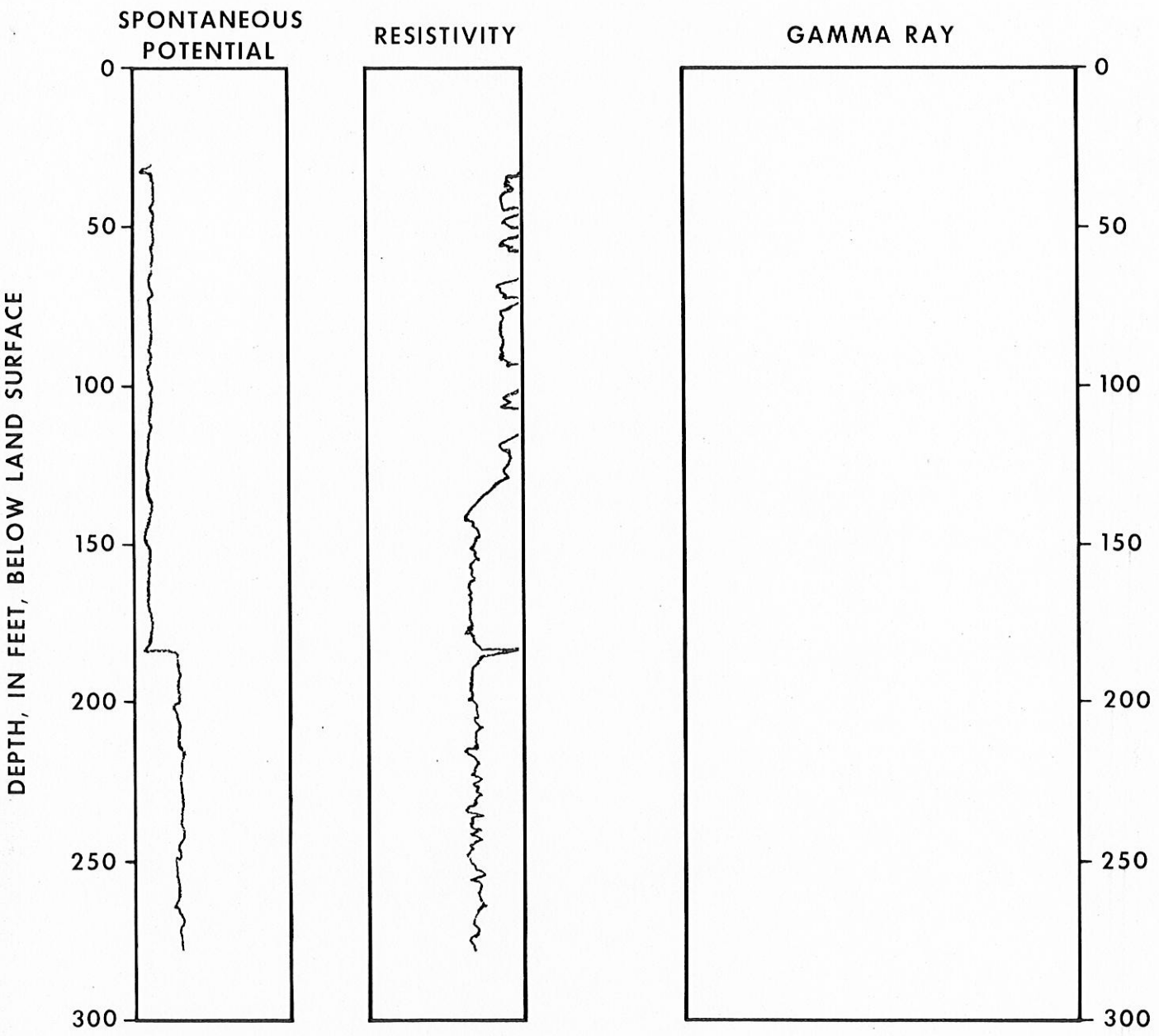

FIGURE D-11 GEOPHYSICAL LOGS-WELL L-M-938

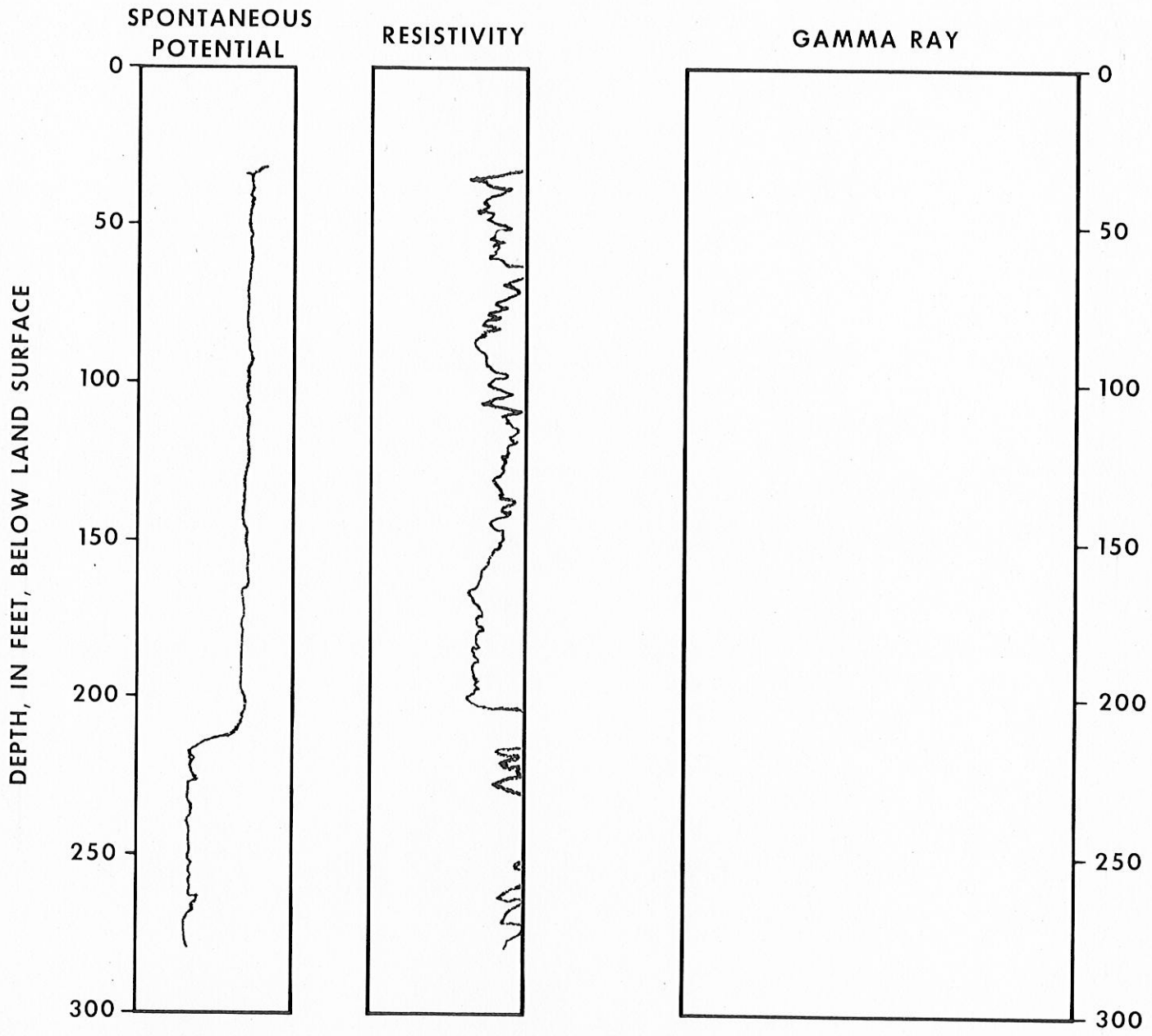

FIGURE D-12 GEOPHYSICAL LOGS-WELL L-M-940