Executive Summary
TR 9-1
Core and Monitor Well

Location - ROMP Site TR 9-1 is located in E. O. Simmons Park in Hillsborough County approximately .2 mile east of the Ranger's Office at the park entrance. The site is located in Section 36, Township 31 South, Range 18 East and at latitude 27°44'16", longitude 82°27'38".

Site Easement - This site was obtained from Hillsborough County on March 6, 1974 for the sum of one dollar. The Perpetual Easement is 20 feet by 20 feet and the Temporary Construction Easement was 60 feet by 60 feet. The Perpetual Easement is recorded in O.R. Book 2851 Pages 544 through 546 at the Hillsborough County Courthouse.

Reason for Coring - This site was cored in order to obtain geologic samples and to locate the freshwater-saltwater interface.

Geology - This site is located on the Pamlico Terrace at an elevation of ± 5 feet above mean sea level (MSL). All geologic data was obtained from core samples and was described to a depth of 470 feet below land surface datum (LSD). The generalized geology of this site is as follows:

0-80'	Sand, clay, and marl
80'-178'	Hawthorn Formation
178'-294'	Tampa Limestone
294'-470'	Suwannee Limestone

Hydrogeology - The artesian aquifer was encountered at a depth of ± 86 feet below LSD in the Hawthorn formation. The artesian aquifer is overlain by ± 40 feet of a mixture of clay, marl and limestone. The water level in the well rose to +7 feet above LSD once this artesian zone was penetrated. Although no other water level measurements were recorded a second artesian

IIA

zone may exist below 250 feet. The top of the Tampa limestone which is found between the depths of ±178 and 250 feet contains a great deal of interbedded sands, limestone, and dolomite which might act as a confining bed. A detailed analysis of the core samples by Dr. Sam Upchurch revealed that the porosity and permeability of this area was low with the underlying area below ± 290 feet being high. The zone from ± 250 to ± 290 feet was considered to be of moderate capacity. The Suwannee limestone (top at ± 294 feet below LSD) could be the top of a second artesian zone. The porosity and permeability of the Hawthorn and Suwannee are considered to be high with the Tampa limestone ranging from low to high in alternating bands.

No pumping tests were conducted at this site.

Core Drilling - This site was cored by the District owned CME between November 12, 1975 and March 3, 1976 at a cost of $ or $ per foot. Continuous core samples of 1 7/8 inch diameter were obtained from 80 to 460 feet below LSD. These samples were sent to the University of South Florida where Dr. Sam Upchurch prepared a detailed description of the samples and forwarded a report to SWFWMD which is contained in the TR 9-1 file and SWFWMD library.

Well Construction - The monitor well was constructed by the District owned Portadrill in March, 1976 at a cost of $ or $ per foot.

This well was constructed by using 80 feet of 14 inch steel work casing and 124 feet of 8 inch PVC casing. In addition 8 feet of 8 inch PVC casing was added onto the surface of the well in order to prevent the

well from flowing since it has a head of 7 feet above MSL. Upon completion of the grouting operation the well was drilled out to a depth of 288 feet below LSD and developed. The well is open to the lower Hawthorn and all of the Tampa formations.

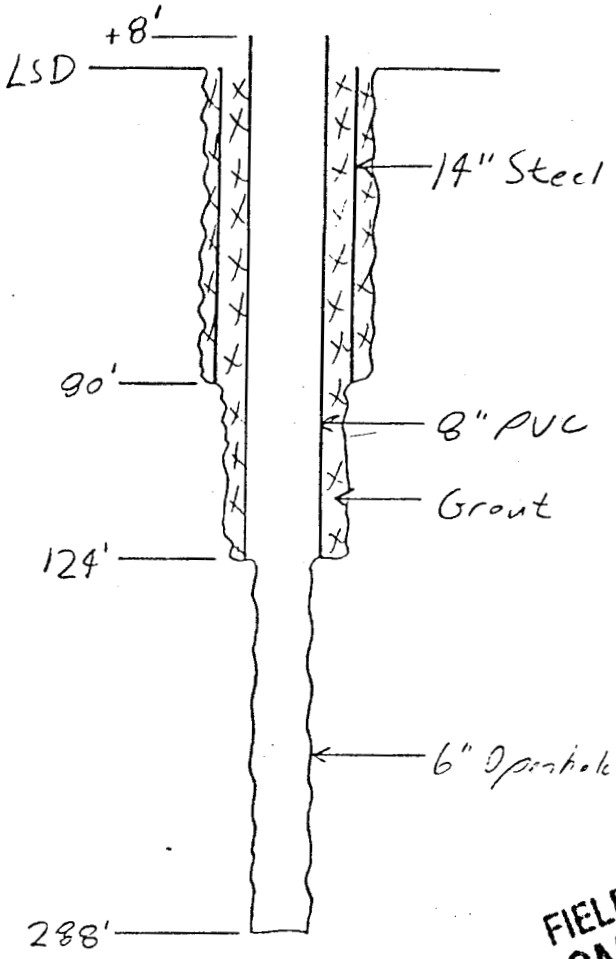
Geophysical Logs - Electric, caliper, gamma, and temperature logs were obtained on this core and well.

Type of Monitor - Since the chloride levels were low down to a depth of ± 460 feet below LSD. This well has been designed to monitor the potentiometric levels in the lower Hawthorn and Tampa formations.

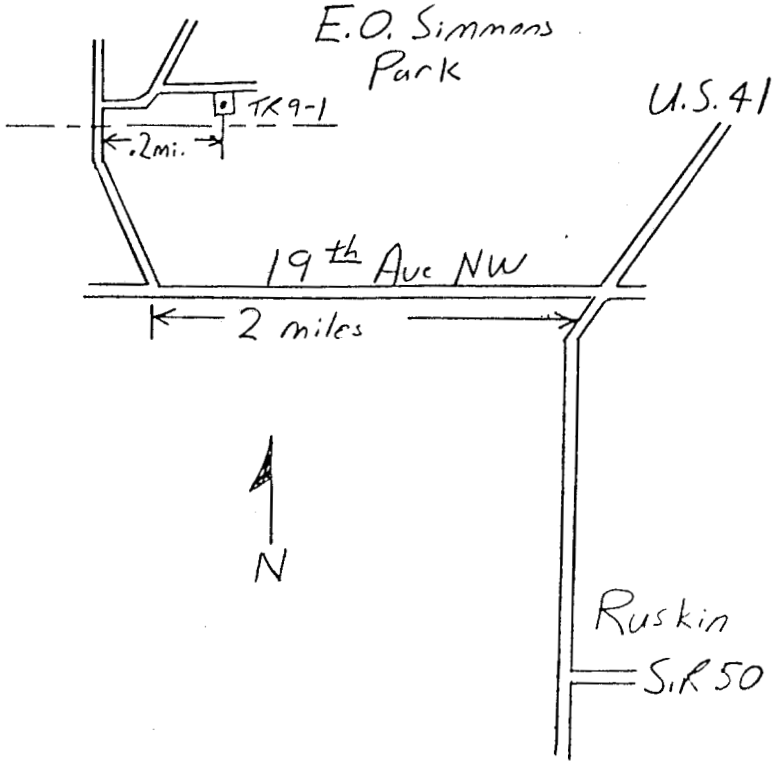
Water Quality - Chlorides, sulfates, fluorides, calcium, and conductivity analyses were conducted on 32 water samples from this site. The chlorides ranged from 26 to 58 milligrams per liter (mg/L), the fluorides from .5 to .7 mg/L and the sulfates from 289 to 489 mg/L. The sulfates were the only parameter that was tested for that exceeded the set limit of 250 mg/L and were high throughout the core hole. The conductivities ranged from 850 to 1000 micromhos per centimeter. Due to the high concentration of sulfates this water is not considered to be potable.

U.S.G.S. Notification - The U.S.G.S. was notified in June, 1976 that this well was complete and ready for monitoring.

As Built
Well Diagram



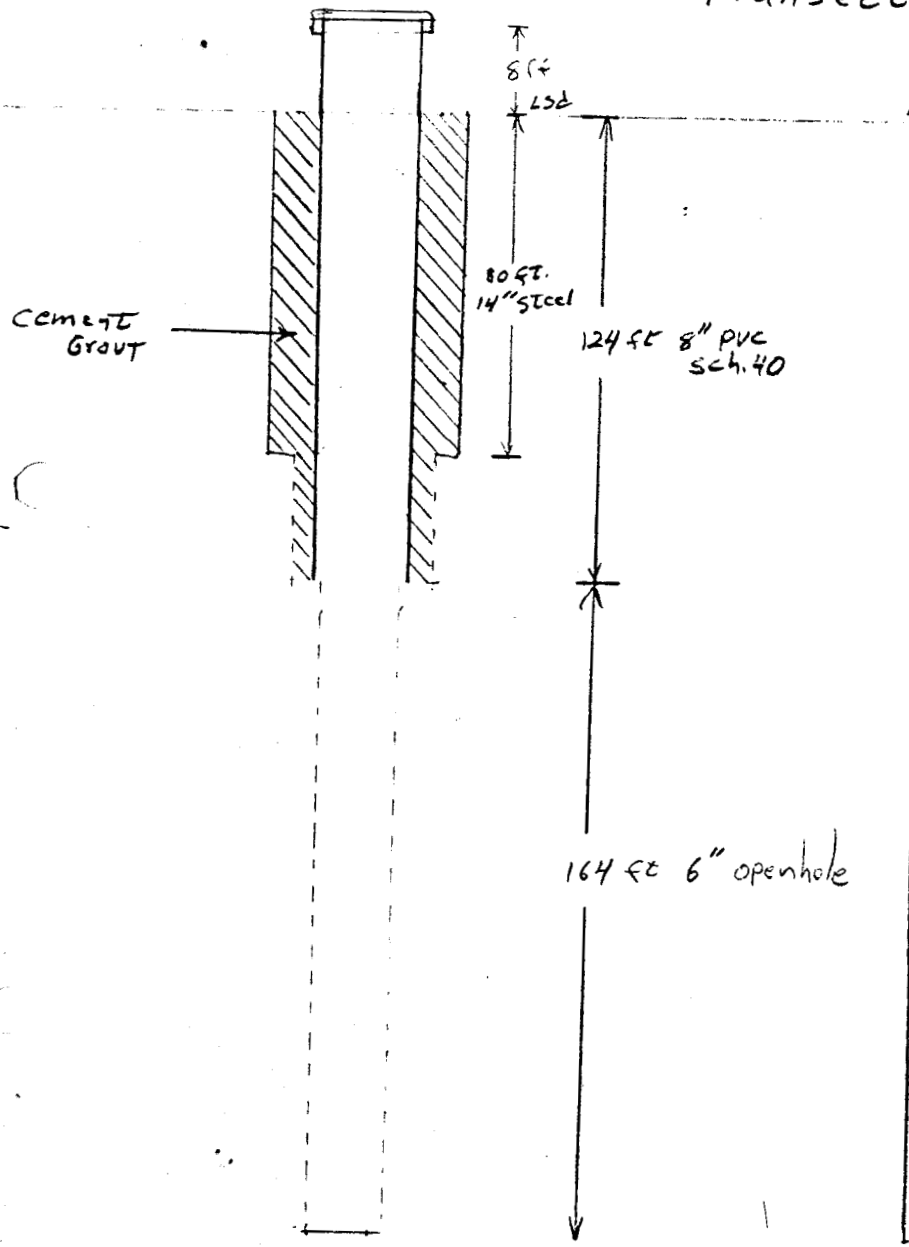
Site Location

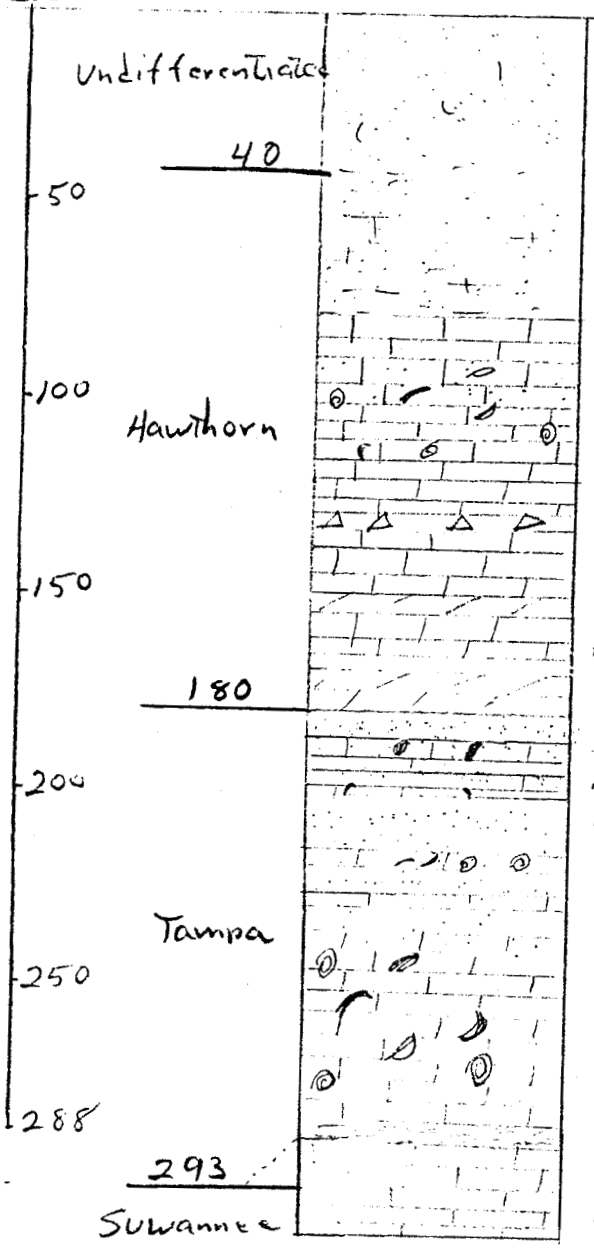


S36, T31, R18
Hillsborough Co.

II B

Transect NO. 4 - Well 1 - 288 ft. deep





Quartz Sand, Medium to fine poorly sorted. contains shell fragments.

Marl, Greenish gray clay with micrite pebbles and minor lenses.

Micrite contains pelecypods and gastropods. highly porous in zones. Contains Quartz Sand.

cherts

Alternating layers of biomicrite and dolostone

Alternating layers of Quartz arenite and Biomicrite, contains gastropods and pelecypods

Biomicrite, yellowish gray, high porosity, contains gastropods and pelecypods.

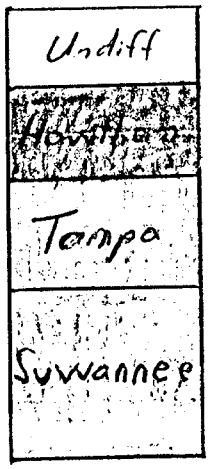
clay, Greenish gray, plastic.

Poorly washed biosparite, yellowish gray

+200

ROMP TR9-1

MSL



+6
-75
-172
-287
-460

-200

-400

-600

APPENDIX A

ROMP LITHOLOGIC LONG TR9 S1, SIMMONS PARK, ~~ROMP 51~~

HILLSBOROUGH COUNTY, FLORIDA

HAWTHORN FORMATION (Miocene)

81.5 - 83.5 INTRAMICRUDITE, sandy, clayey, pale olive color, medium porosity, medium permeability, some chert and phospahte pellets.

83.5 - 86.5 BIOMICRUDITE, sandy, packed, moldic, yellowish gray color, medium porosity, medium permeability, some phosphate pellets, gastropods and pelecyopods.

86.5 - 87.5 MICRITE, sandy, slightly mottled, moldic, yellowish gray color, medium porosity, medium permeability, some phosphate pellets.

87.5 - 91.5 INTRAMICRUDITE, dense, yellowish gray color, medium porosity, medium permeability, phosphate pellets, becomes a sandy intramicrudite with med-high porosity with depth, laminated at top.

91.5 - 93.5 PELMICRITE, white color, high porosity, high permeability, some phosphate pellets, poorly cemented.

93.5 - 108.5 BIOMICRITE, dense, moldic, mottled - medium dark gray to grayish yellow color, low porosity, low permeability, phosphate pellets, gastropods, pelecyopods.

108.5-109.5 BIOPELMICRITE, moldic, grayish yellow color, high porosity and permeability, sparry calcite cement filling molds, some phosphate pellets, gastropods, and pelecyopods.

109.5-110.5 INTRAMICRUDITE, sandy, mottled grayish yellow to medium gray color, algal laminations, some allochmes, moldic, phosphatic stringers, high porosity and permeability, gastropods, pelecyopods and forams.

110-5-114.5 BIOPELMICRITE, sandy, grayish yellow color, high porosity and permeability, some phosphate pellets, gastropods and pelecyopods, weathering rind @ 113.5, sandy below with mucr sps.

114.5-120.5 PELMICRITE, grayish yellow color, high porosity and permeability, gastropods, and pelecyopods, some phosphatic stringers and pellets throughout, becomes more dense @ 114-115 with more phospahte pellets, becomes more a moldic packed biomicrite with sand sized fragments, goes back @ 115.5 to a sparce, sandy pelmicrite, goes back @ 118.5 to a pelmicrite and turns a poorly-consolidated, slightly-sandy, white color.

120.5-127.5 PELMICRITE, very slightly moldic, white color, high porosity and permeability, phosphate pellets, becomes more plastic @ 125.5.

127.5-128.5 CHERT, laminated, replacing micrite matrix, allochems not replaced, no porosity or permeability, grayish brown color some dense micrite intersperced.

III A

128.5-131.5 SPARCE BIOMICRITE, moldic, yellowish gray color, high porosity and permeability, phosphate pellets, gastropods, pelecyopods, becomes a packed biopelmicrite @ 128.5-129 which is extremely porous and permeable with leached zone.

131.5-133.0 PACKED BIOMICRITE, very moldic, with sand-sized grains, pale yellowish organe, high porosity and permeability, some pelecyopods, no quartz sand.

133.0-134.5 SPARCE MICRITE, slightly moldic, very pale orange colorm medium porosity and permeability, some forams.

134.5-135 POORLY-WASHED BIOSPARITE, moldic, light olive gray color, high porosity and permeability.

135.0-141.0 MICRITE, slightly moldic, light olive gray color, high porosity and permeability, scattered bivalve molds.

141.0-141.5 PACKED BIOMICRITE, moldic, pale yellowish orange, high porosity and permeability, sand-sized fragments, pelecypod molds, slightly leached.

141.5-144.0 PACKED BIOMICRITE, moldic, yellowish gray color, high porosity and permeability, sand-sized allochems, abundant echinoid plates.

144.0-148.0 SPARSE BIOMICRITE, less moldic, more dense, yellowish gray color, high porosity and permeability.

148.0-153.5 POORLY-WASHED BIOSPARITE, dolomitic, olive gray color, low porosity and permeability, poorly-sorted grain stone, better cemented, few intraclasts, becomes more micritic with depth starting @ 150, traces of quartz sand, pelecypod molds, corals, echinoids, bryozoans.

153.5-155.5 MICRITE, poorly cemented, sandy, yellowish gray color, high porosity and permeability, no fossils.

155.5-156.0 INTRAMICRUDITE, sandy, low porosity and permeability, matrix-moldic, micrite cement with quartz sand, grainstone with a dark greenish gray color;
Allochems: less sand, micrite, hematitic stain, weathering rinds on few fossils, light olive gray color.

156.0-159.0 MICRITE, sandy, mottled, grayish yellow green color, low porosity and permeability, wackstone, @ bottom one inch of intramicrudite.

159.0-163.5 MICRITE, mottled, sandy, yellowish gray, high porosity and permeability, burrowed, more sandy at bottom, packstone, few intraclasts and disruption zones.

163.5-168.5 MICRITE, very quartzose, dolomitic, grayish yellow green color, low porosity and permeability, very sandy packstone, sand irregularly distributed, slightly moldic.

168.5-178.5 DOLOSTONE, MOTTLED, SANDY, dark areas dolomite with an olive gray color, light areas limestone with a yellowish gray color, low porosity and permeability.

TOP OF TAMPA FORMATION (MIOCENE)

178.5-181.0 QUARTZ ARENITE, with micrite cement, yellowish gray color, medium porosity and permeability, packstone.

181.0-182.0 BIOMICRITE, very quartzose, moldic, slightly fossiliferous, yellowish gray color, high porosity and permeability, packstone.

182.0-184.5 QUARTZ ARENITE, with micrite cement, yellowish gray color, high porosity and permeability.

184.5-188.5 MICRITE, quartzose, slightly fossiliferous, grayish yellow color, medium porosity and permeability, few intraclasts, vugs with sparry calcite cement, varies from a wackstone to a packstone, distribution of sand very irregular, @ 185.5 and 184.5 thin seams of moldic pelecypod in quartzose biomicrite with sparry calcite cement.

188.5-190.5 SPARSE BIOMICRITE, moldic and quartzose, yellowish gray color, medium porosity with low permeability, very large vugs, gastropod and pelecypod fragments, not much sparry cement, very poorly sorted.

190.5-191.5 PACKED BIOMICRITE, quartzose, light olive gray to medium dark gray, medium porosity and permeability, pelecypods better sorted and smaller, slightly moldic, packstone, mottled.

191.5-196.0 QUARTZ ARENITE, laminated, micritic, yellowish gray color, medium porosity and permeability, packstone, forams, pelecypod molds, dark brown laminated chert stringers, some molds filled with sparry calcite, some burrows filled with micrite which is cut by chert stringers.

196.0-196.5 QUARTZ ARENITE, micrite cement, yellowish gray color, high porosity and permeability, slightly moldic, packstone.

196.5-197.5 PACKED BIOMICRITE, quartzose, grayish yellow color, high porosity and permeability, packstone, slightly mottled, gastropods, large pelecypods, echinoid plates.

197.5-199.0 BIOMICRITE, quartzose, grayish yellow color, medium porosity and permeability, gastropod molds.

199.0-199.5 MICRITE, chert stringers, quartzose, grayish yellow color, medium porosity and permeability, @ 199.5 a thin seam of intramicrudite.

199.5-200.5 QUARTZ ARENITE, with micrite cement, grayish yellow color, high porosity and permeability.

200.5-204.5 INTRASPARUDITE, dolomite, mottled and quartzose, allochems are more quartzose with a dark gray color and are not dolomitic, matrix has less quartz grains with a grayish yellow color.

204.5-208.5 QUARTZ ARENITE, with micrite cement, grayish yellow color, high porosity and permeability, no fossils.

208.5-213.5 QUARTZ ARENITE, with a dolomitic micrite cement, mottled yellowish gray color, medium porosity and permeability, more dense than above.

213.5-214.0 PELMICRITE, mottled, yellowish gray color, high porosity and permeability.

214.0-217.0 INTRAMICRUDITE, dolomitic, and mottled, dusky yellow dolomite-micrite allochems, yellowish gray calcite micrite matrix, sand grains unevenly distributed between allochems and matrix.

217.0-218.0 QUARTZ ARENITE, with micrite matrix, pale olive color, high porosity and permeability.

218.0-220.5 INTRAMICRUDITE, very quartzose, pale olive color, low porosity and permeability.

220.5-223.0 QUARTZ ARENITE with micrite cement, grayish olive color, high porosity and permeability.

223.0-224.5 MICRITE, very quartzose, mottled, yellowish gray color, low porosity and permeability.

224.5-225.5 QUARTZ ARENITE, dense with micrite cement, moderate olive color, low porosity and permeability, some pelecypods, slightly moldic.

225.5-228.0 INTRAMICRUDITE, quartzose, yellowish gray color, low porosity and permeability.

228.0-232.0 QUARTZ ARENITE, with micrite cement, yellowish gray color, high porosity and permeability at bottom one foot, low porosity and permeability.

232.0-233.5 QUARTZ ARENITE, very dense, mottled with micrite cement, moderate olive brown color, low porosity and permeability, vugs filled with calcite spar and micrite.

233.5-234.5 INTRAMICRUDITE, dense very quartzose, yellowish gray color, low porosity and permeability.

234.5-235.0 MICRITE, quartzose, white color, high porosity and permeability.

235.0-236.0 INTRAMICRUDITE, quartzose, greenish gray color, low porosity and permeability.

236.0-238.0 QUARTZ ARENITE, with micrite cement, greenish gray color, medium porosity with high permeability.

238.0-243.0 INTRAMICRUDITE, quartzose, yellowish gray color, low porosity and permeability, matrix is a very quartzose micrite packstone, allochems are less quartzose micrite which is slightly moldic, weathering rinds around allochems.

243.0-244.0 SPARSE BIOMICRITE, moldic, yellowish gray color, medium porosity, low permeability, some pelecypods, similar to allochems in previous unit.

244.0-248.0 INTRAMICRUDITE, moldic, yellowish gray color, medium porosity and low permeability, gastropods, pelecypods.

248.0-254.0 INTRAMICRUDITE, dense, yellowish gray color, low porosity and permeability, few pelecypod molds, layered @ 249.

254.0-258.5 MICRITE, mottled and dense, light olive gray color, low porosity and permeability.

258.5-261.0 INTRAMICRUDITE, yellowish gray color, high porosity and permeability, allochems are a packed biomicrite with forams and echinoid plates, matrix is an pelmicrite.

261.0-275.5 SPARSE BIOMICRITE, moldic and dense, yellowish gray color, medium porosity and permeability, pelecypod molds.

275.5-278.0 INTRAMICRUDITE, dense, yellowish gray color, medium porosity and permeability, no macro-fossils.

278.0-283.5 INTRAMICRUDITE, dense, yellowish gray color, medium porosity and permeability, matrix is an pelmicrite, allochems are at times biomicritic with forams and echinoid plated or micrite.

283.5-288.0 BIOMICRUDITE, slightly moldic, yellowish gray color, high porosity and permeability, pelecypod molds.

288.0-288.5 CLAY, green color.

288.5-293.0 INTRAMICRUDITE, yellowish gray color, medium porosity and permeability.

TOP OF SUWANNEE FORMATION (OLIGOCENE)

293.0-470.0 POORLY-WASHED BIOSPARITE, yellowish gray color, high porosity and permeability, foram chips, echinoid plates some pelecypod molds, very homogeneous.

470.0 BOTTOM OF CORE.

APPENDIX B

WATER QUALITY ANALYSES

SAMPLE DEPTH	CONDUCTIVITY (μmhos/cm)	F^- (mg/l)	Cl^- (mg/l)	Ca^{+2} (mg/l)
98.5	950	.5	44	112
108	1000	.6	46	120
113	1000	.6	44	124
118	950	.5	46	120
128.5	1000	.6	44	128
133.5	1000	.5	56	120
138	1000	.5	56	116
148	950	.5	55	108
158.5	1000	.6	54	116
168	950	.6	58	116
173	900	.5	58	116
183.5	900	.6	40	112
203.5	950	.5	48	112
213.5	950	.6	26	120
223.5	1000	.7	38	116
253.5	850	.6	50	108
263.5	900	.7	26	112
273.5	850	.6	26	108
288.5	900	.5	30	108
303.5	900	.6	28	108
318.5	850	.6	26	108
333.5	900	.6	30	108
348.5	900	.6	30	112
363.5	900	.6	30	116
378.5	900	.5	32	112
393.5	900	.6	28	116
408.5	900	.6	30	108
423.5	900	.7	28	116
425.3	900	.6	26	100
440	850	.6	28	104
455	950	.6	30	128
470	900	.7	26	108

III B

Sulfate Analyses and Calcium/Sulfate Ratios for ROMP Well TR9-1, Simmons Park, Hillsborough County, Florida

Depth (feet)	Sulfate (mg/l)	$\frac{\text{Calcium}}{\text{Sulfate}}$[1]
98.5	385	0.29
108	422	0.28
113	489	0.25
118	432	0.28
128.5	398	0.32
133.5	386	0.31
138	362	0.32
148	355	0.30
158.5	333	0.35
168	333	0.35
173	373	0.31
183.5	350	0.32
203.5	352	0.32
213.5	367	0.33
223.5	385	0.30
253.5	320	0.34
263.5	309	0.36
273.5	309	0.35
288.5	302	0.36
303.5	352	0.31
318.5	342	0.32
333.5	345	0.31
348.5	333	0.34
363.5	302	0.38
378	289	0.39
393.5	290	0.40
408.5	398	0.27
423.5	302	0.38
425	345	0.29
440	398	0.26
455	388	0.33
470	289	0.37

1. Calcium is measured as activity while sulfate is total concentration. The ratio of calcium to sulfate is a measure of the mixing of sea water and carbonate ground water and is explained in the text.

Design and Completion
TR 9-1
288 Ft. Deep

The 288 ft. deep well at TR 9-1 is designed as a potentiometric monitor for the Hawthorn and Tampa Formations. The casing is set at 124 feet below land surface and the open hole section is from 125 feet to 288 feet terminating in a thin clay layer. The bottom clay layer is at the very bottom of the Tampa formation.

The original purpose in coring and drilling at TR 9-1 was to locate the saltwater-freshwater interface. The interface was found to be deeper than expected, therefore, it was decided that a potentiometric monitor would be sufficient.

III.B

Sulfate Analyses and Calcium/Sulfate Ratios for ROMP Well TR9-1, Simmons Park, Hillsborough County, Florida

Depth (feet)	Sulfate (mg/l)	$\frac{\text{Calcium}}{\text{Sulfate}}$[1]
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128.5	398	0.32
133.5	386	0.31
138	362	0.32
148	355	0.30
158.5	333	0.35
168	333	0.35
173	373	0.31
183.5	350	0.32
203.5	352	0.32
213.5	367	0.33
223.5	385	0.30
253.5	320	0.34
263.5	309	0.36
273.5	309	0.35
288.5	302	0.36
303.5	352	0.31
318.5	342	0.32
333.5	345	0.31
348.5	333	0.34
363.5	302	0.38
378	289	0.39
393.5	290	0.40
408.5	398	0.27
423.5	302	0.38
425	345	0.29
440	398	0.26
455	388	0.33
470	289	0.37

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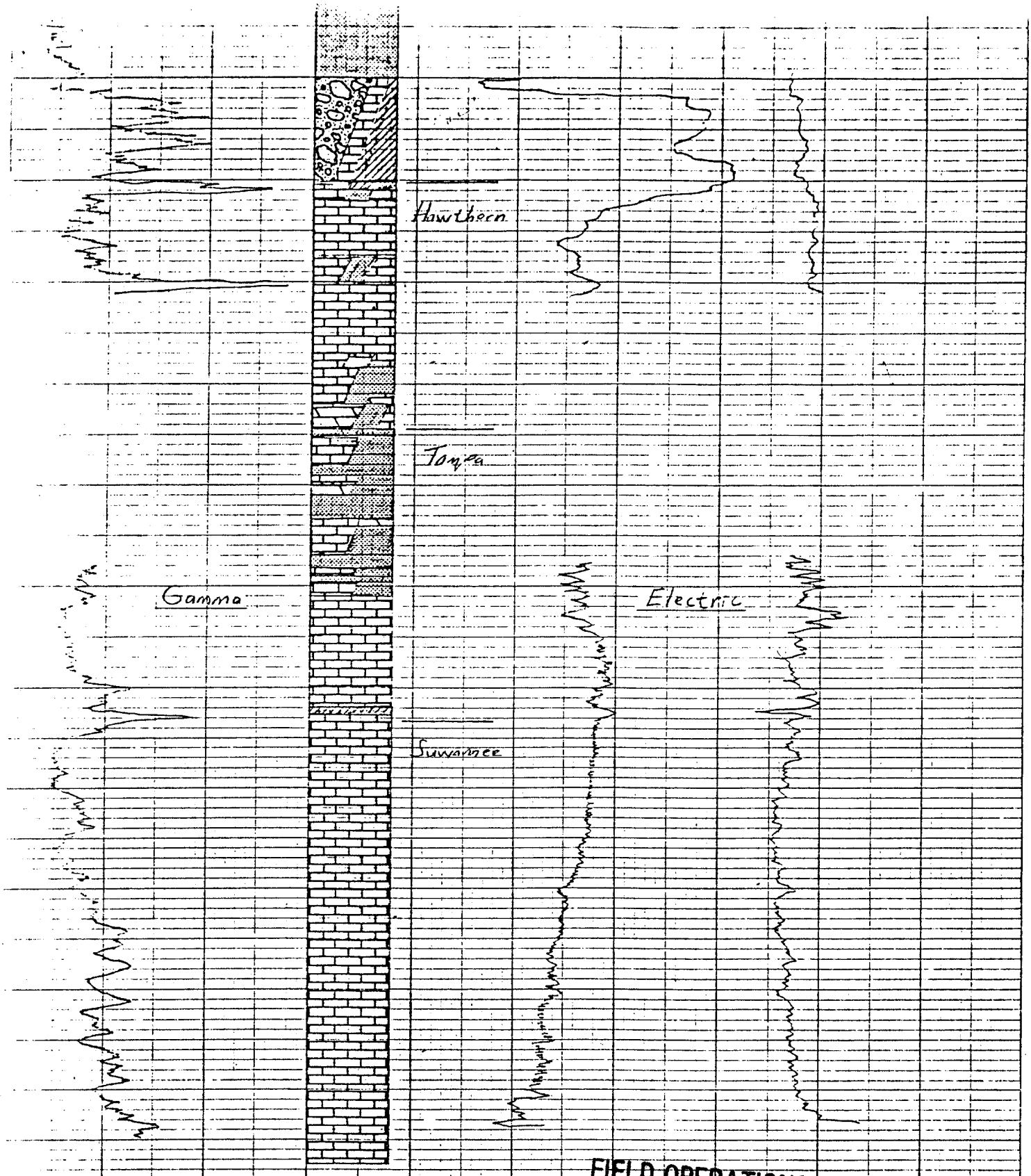
III B



III A

Tr 9-1 Cl^-

DEPTH FEET		MG/L
98		44
108		46
113		44
118		46
128.5		44
133.5		56
138		56
148		55
158.5		54
168.5		58
173		58
183.5		40
203		48
213		26
223		38
(HUNG IN HOLE-NO SAMPLES)		
253.5		50
273.5		26
263.5		26
288.5		30
303		28
318		26
333	#2	30
333	#1	38

DEPTH FEET		MG/L
348		38
363		28
363	#2	30
378	#2	32
378	#1	42
393	#3	28
393	#1	36
393	#2	32
408		38
408	#2	44
408	#3	30
423	#2	28
423	#3	28
425	#2	28
425	#1	28
425	#3	28
425	#4	28
440	#2	28
455		30
470	#2	28
470	#1	32
470	#3	26

45 Samples