Project Report No. 11
South Georgia Minerals Program

Georgia
State Division of Conservation
Department of Mines, Mining and Geology

A. S. Furcron, Director

Phosphorite

By
Mineral Engineering Branch, Engineering Experiment Station
Georgia Institute of Technology, and
Georgia Department of Mines, Mining, and Geology

April 1969

This program is being carried out under contract as
Project A-880 of the Georgia Institute of Technology,
Atlanta, Georgia

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INTRODUCTION

This Project Report constitutes the eleventh in a series that have been issued since this program was initiated July 1, 1965. Three more are in preparation for issuance by July of this year (1969). To repeat from previous reports, all information from the program is published and released as progress reports as soon as feasible. An exception was Project Report No. 7, which was a contribution of the U. S. Geological Survey.

Emphasis in reports 2,3,4,5,9,10, and this report is on phosphorite. This concludes for the present, the reports wherein primary emphasis has been on phosphorite. Due to several factors, primary emphasis has shifted to other mineral commodities.

Previous reports have given all data and tests from a given hole and have reported several commodities. In this Project Report, in order to clear up the phosphorite exploration results, we are publishing only phosphorite data. In addition, phosphorite data is included from some holes where primary testing was for clays. Thus, this report, as well as the next three will be on a commodity basis. Many of the same holes will be used as different commodities were found at different horizons. Commodities for which data will be published are sand, clay, and heavy minerals. The clay report will include the fuller's earths.

Lithologic logs for the sand report will have more petrographic descriptions than included herein. Electric and gamma-ray logs may be republished.

There is a repeat of the explanation and use of the "Figures of Merit" used in this and other reports. As this report deals only with phosphorite the "Figures of Merit" should assist in evaluating the phosphorites of

potential economic use.

As an appendix there is a chart summing where information may be found in each of the eleven reports todate.

It will be noted that beneficiation data presented in this publication is all from computer printouts.

PLANS

Current and near future drilling is directed toward clays and other commodities of Southwest Georgia. Emphasis will be on kaolins, high alumina clays, fuller's earths, and limestones.

During the next biennial beginning in July 1969, some work is planned north of the Fall Line with a diamond drill. Other studies include the use of a new sensing device developed at Georgia Tech for heavy mineral and radiometric studies. All tests todate indicate that finding and delineating near surface heavy mineral bodies is greatly facilitated with the Tech developed instrumentation system.

OBJECTIVE AND SCOPE

The objective of the South Georgia Mineral Program is to determine the existence, preliminary quality-quantity data, and approximate location of mineral deposits having economic feasibility potential for establishing new, or expanded, mineral industries in Georgia.

This report contains data on phosphorite from cores and wash samples from drilling in Berrien, Brooks, Bulloch, Chatham, Clinch, Colquitt, Crawford, Houston, Lowndes, Pulaski, Twiggs, and Wilkinson Counties. This concludes, for the time, data from holes where drilling was primarily for phosphorite, although data from a few holes where other commodities were of primary interest are included.

SUMMARY

General

Phosphorite deposits of potential economic development have been found in Eastern Chatham County and in areas northward from the Florida border between Thomas and Clinch Counties.

The Chatham County deposit has received intensive attention by industry in expectation of commercial utilization.

The Chatham County deposits thin out northward and westward. Southward it is believed that the deposit is too deep for economic recovery using present mining methods. The deposit also appears to be seaward from Chatham County. The Chatham County phosphorite is similar in composition and grade to the North Carolina deposit.

The South Georgia deposits, similar to those in Florida, appear to have their greatest potential along northward extensions of the Barwick Arch and the Ocala Uplift. The Barwick Arch appears to be truncated on the north by the extension of a structural feature described as the Gulf Trough. Whether this is synclinal, graben, or both has not been determined. On the east the Barwick Arch is bounded by the Georgia Embayment. The Gulf Trough also truncates the Ocala Uplift.

Specific For This Report:

Only Lowndes County hole number 12 revealed a matrix that would encourage further investigation of the immediate area. Clinch hole number 3 revealed multiple matrices, but for this hole they were sub-marginal. When deeper mining methods are relatively more economic some of the Berrien County areas should be re-evaluated.

ECONOMIC FACTORS AND FIGURES OF MERIT

Different companies employ different break-levels and assign various degrees of importance to the several factors pertaining to the economic evaluation of a phosphorite deposit.

In fairness to landowners and others who might not be skilled in the calculations and application of such factors to engineering and economic evaluation, it was decided to indicate a range of levels as reported in the literature, select a mid-point level and present the calculated results for the holes-of-interest, that is, from the cores which showed promise of industrial utilization. (BPL in matrix = 9.0% and higher)

These factors, expressed as numbers, vary widely and can be confusing to the lay public. A "Figure of Merit" concept was devised whereby the calculated factor would be expressed as a ratio, to the break-point level, in such a way that figures of 1.0 or more would represent economic desirability, or if less than 1.0, economic undesirability. For clarification, typical results for a factor having a maximum economic level and for a factor having a minimum economic level are:

1. Overburden. Current strip mining practice places a maximum of 75 to 100 feet on the overburden which can be removed economically, depending upon the quantity and quality of the deposit beneath the overburden. The midpoint of this range was taken as 88 feet. When expressed in terms of "Economic Factors," Berrien County No. Be-6, for the matrix level of 91-121 feet would be "overburden = 91 feet." When expressed as a "Figure of Merit," this would appear as (88/91 : 0.97).

2. Current practice dictates that a matrix bed should be a minimum of 3 feet for mining. For the same hole (Be-6) the matrix encountered had a thickness of 30 feet, and this would be reported as an "Economic Factor." When expressed a a "Figure of Merit", it would be 30/3 = 10.0 which indicates economic desirability for this factor.

Note that the ratios for maximums and minimums are inverted, being

$$\frac{\text{Practice}}{\text{Actual}} \text{ for } \underline{\text{maximum}} \text{ levels of interest}$$

and

$$\frac{\text{Actual}}{\text{Practice}} \text{ for } \underline{\text{minimum}} \text{ levels of interest}$$

Economic Factors presented herein, the ranges of each as obtained from industry and publication, and the level of each employed to calculate a "Figure of Merit" are:

Factor	Unit	Range	Level-Used
Overburden Thickness	ft.	75-100 max.	88
Matrix Thickness	ft	3 min.	3
Matrix BPL	%	10 min.	10
Flotation Concentrate BPL	%	66 min.	66
Rock for Electric Furnace, BPL	%	52 min.	52
Products, BPL	tons/acre-ft.	400 min.	400
Overburden/Matrix	Ratio	1-3 max.	2
Overburden/Products BPL	cu. yd./ton	15-20 max.	17.5
Matrix/Products BPL	cu. yd./ton	5-7 max.	6
$Fe_2O_3 + Al_2O_3$ in Products	%	4-5 max.	4.5
SiO_2/CaO (For Electric Furnace)	Ratio	0.8-1.0 min.	0.9
Products Recovery*	%	58-68 min.	63

*Total BPL recoverable from "pebbles" and flotation concentrates divided by total BPL in matrix.

Certain assumptions, and average values and factors, were made to expedite calculations:

Density of overburden	= 90 lb./cu. ft.
Feet thickness x 1613	= cu. yd./acre
Cubic yards x 1.215	= Tons (2,000 lb.)
Feet thickness x 1960	= Tons/acre

PROCEDURE

In general project procedures were the same as the previous report. Exceptions are noted below:

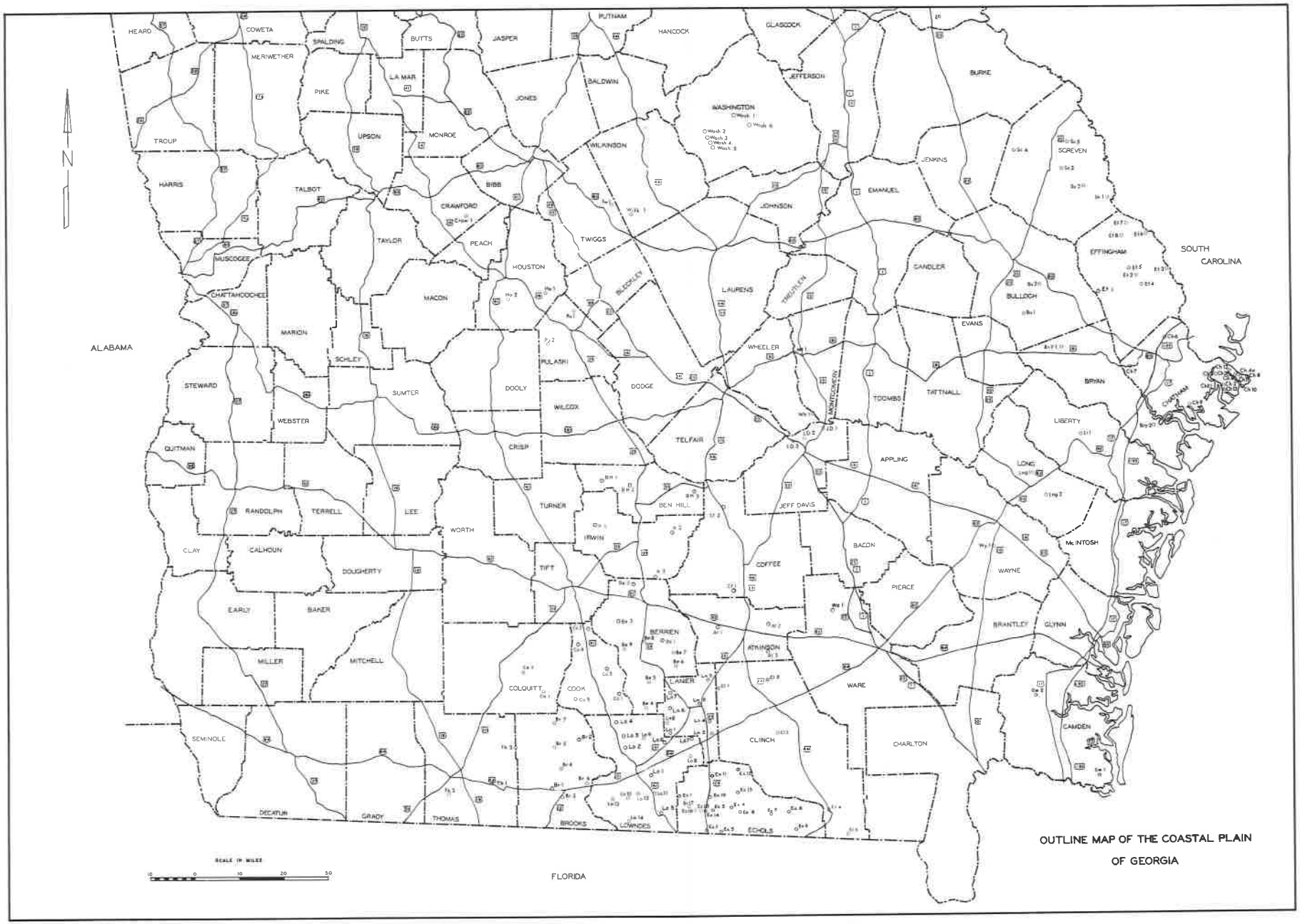
1. For the first time results of beneficiation with "Figures of Merit" were reproduced directly from computer printouts.

2. Figure 2 clarifies and replaces part of the flow chart of core processing as presented in previous reports.

3. X-ray diffraction of phosphorites was not done.

In addition, the BPL content of the matrix had to be at least 9 percent and of the flotation feed at least 7 percent to continue with beneficiation procedures.

Drilling was with both a Failing 1250 and a Failing 250 rig. The inside diameter of the drilling pipe of the larger rig (the 1250) permitted the gamma-ray probe to be lowered through it whereas the smaller rig's pipe did not. Hence, when the hole was caving gamma-ray logs were still obtainable with the large rig.



OUTLINE MAP OF THE COASTAL PLAIN OF GEORGIA

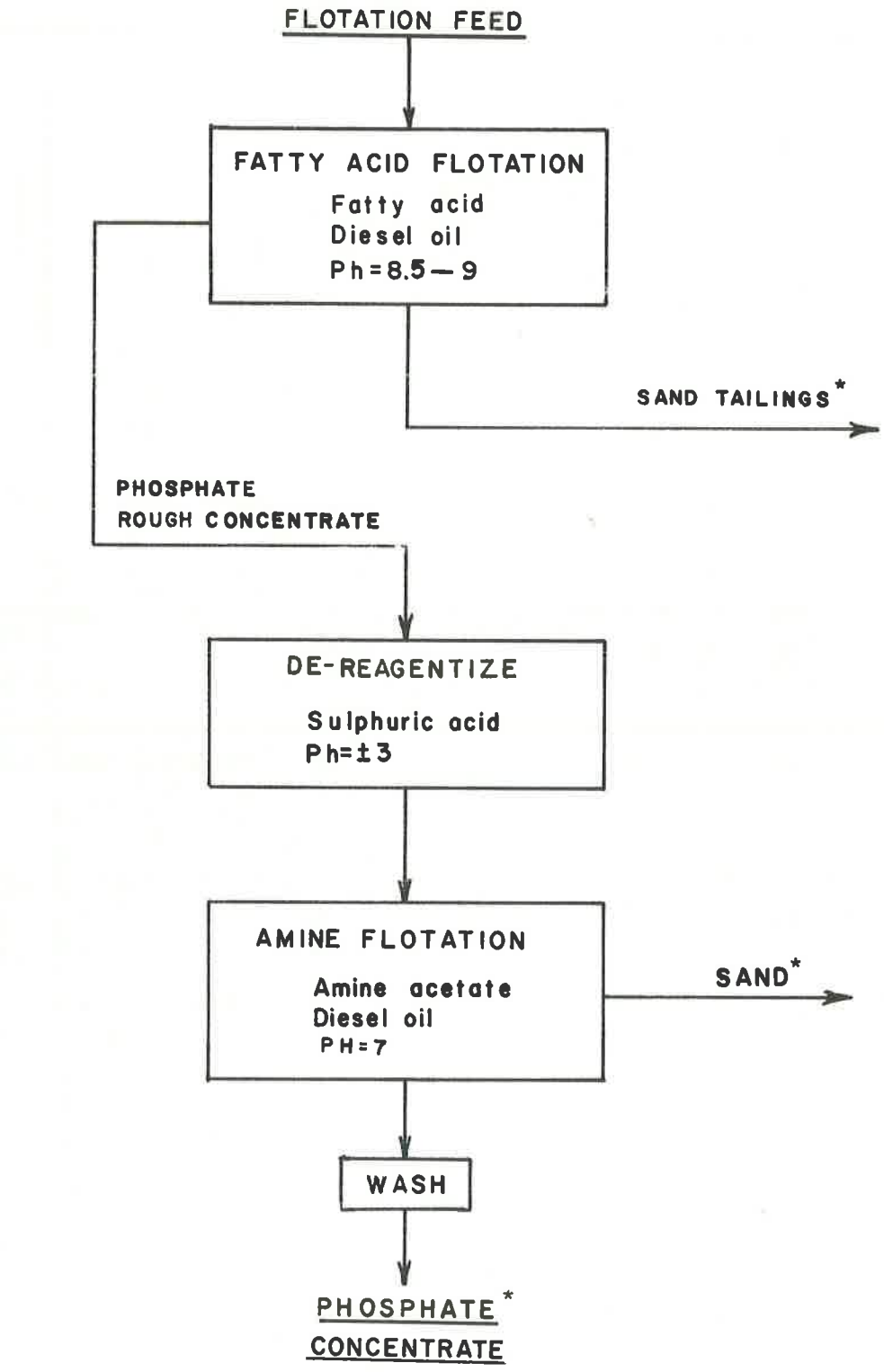


Figure 2. Flow Chart of Core Processing

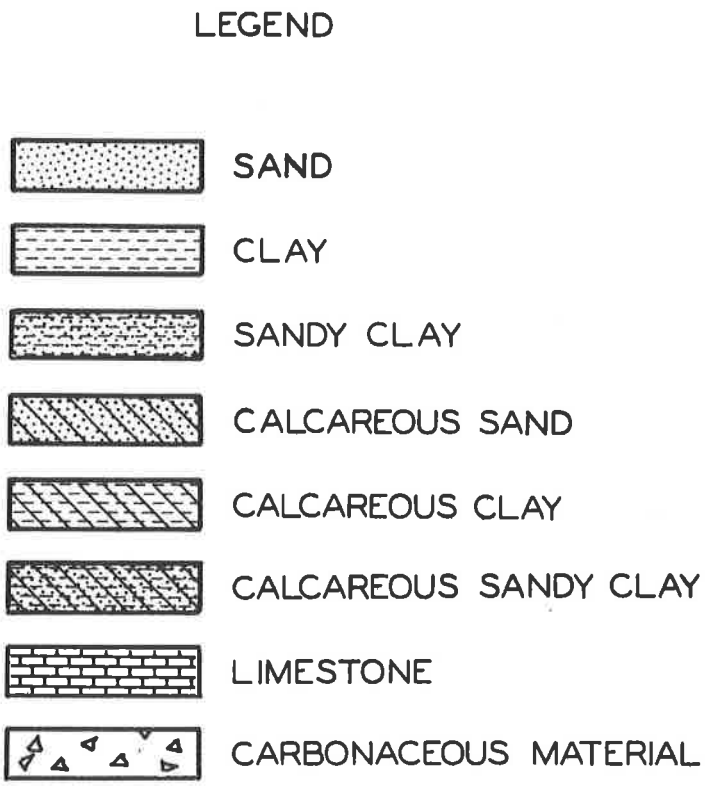


Figure 3. Legend for Lithologic Logs.

BERRIEN COUNTY

BERRIEN COUNTY

SUMMARY OF RESULTS

Six holes were cored in Berrien County, in addition to the three original holes. Of these only one, Be-6, had sufficient phosphorite to warrant beneficiation testing. Two factors would be against development at present. One is the 91 feet of overburden and the other is that only 10 percent of total weight is recoverable as phosphorite. The grade of this 10 percent is quite good however.

Electric logs were not run on Be-5 and Be-6 holes due to cave-in of hole walls. Gamma-ray logs were run inside the drill pipe.

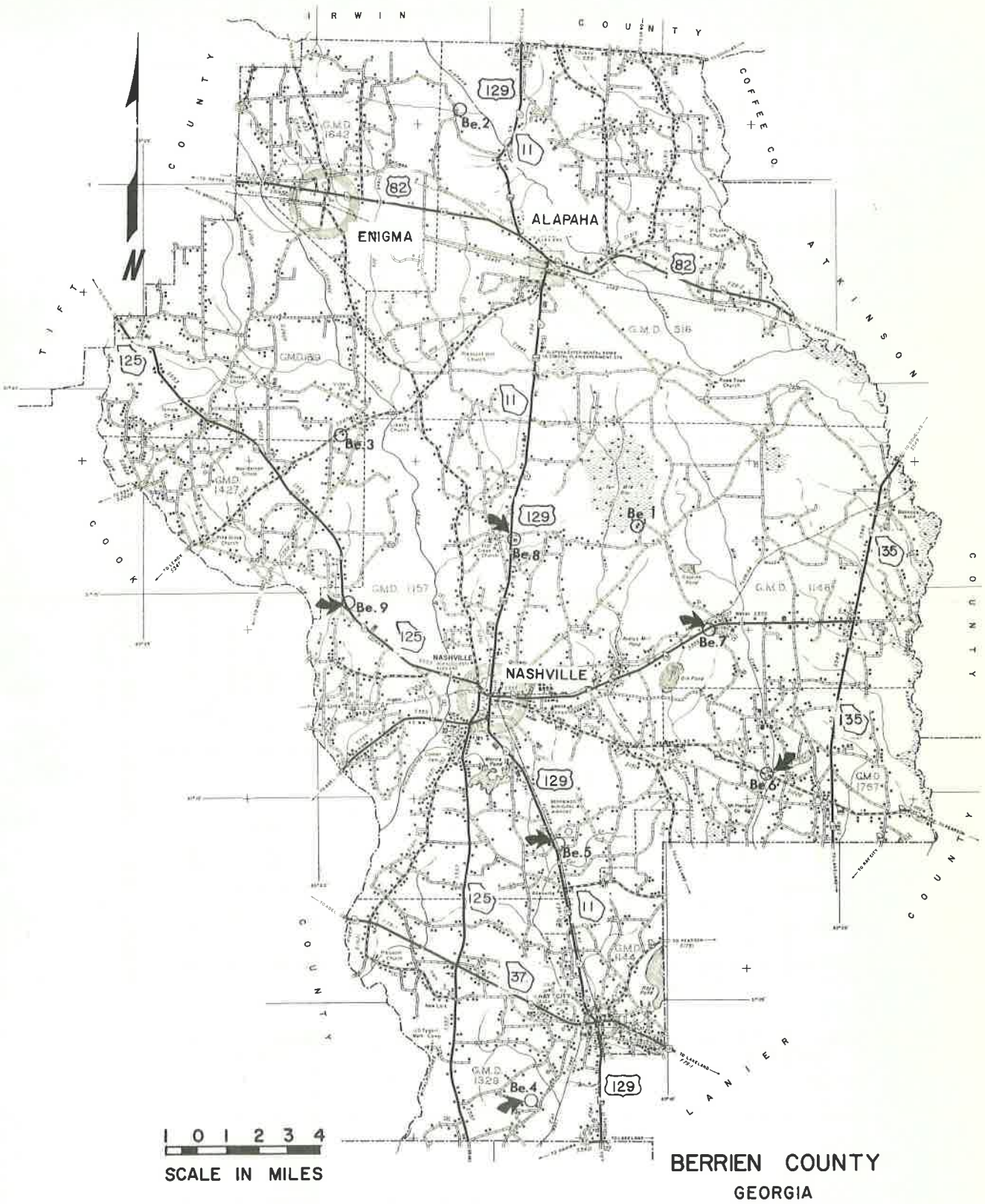


Figure BE-1. Location of Holes - Berrien County

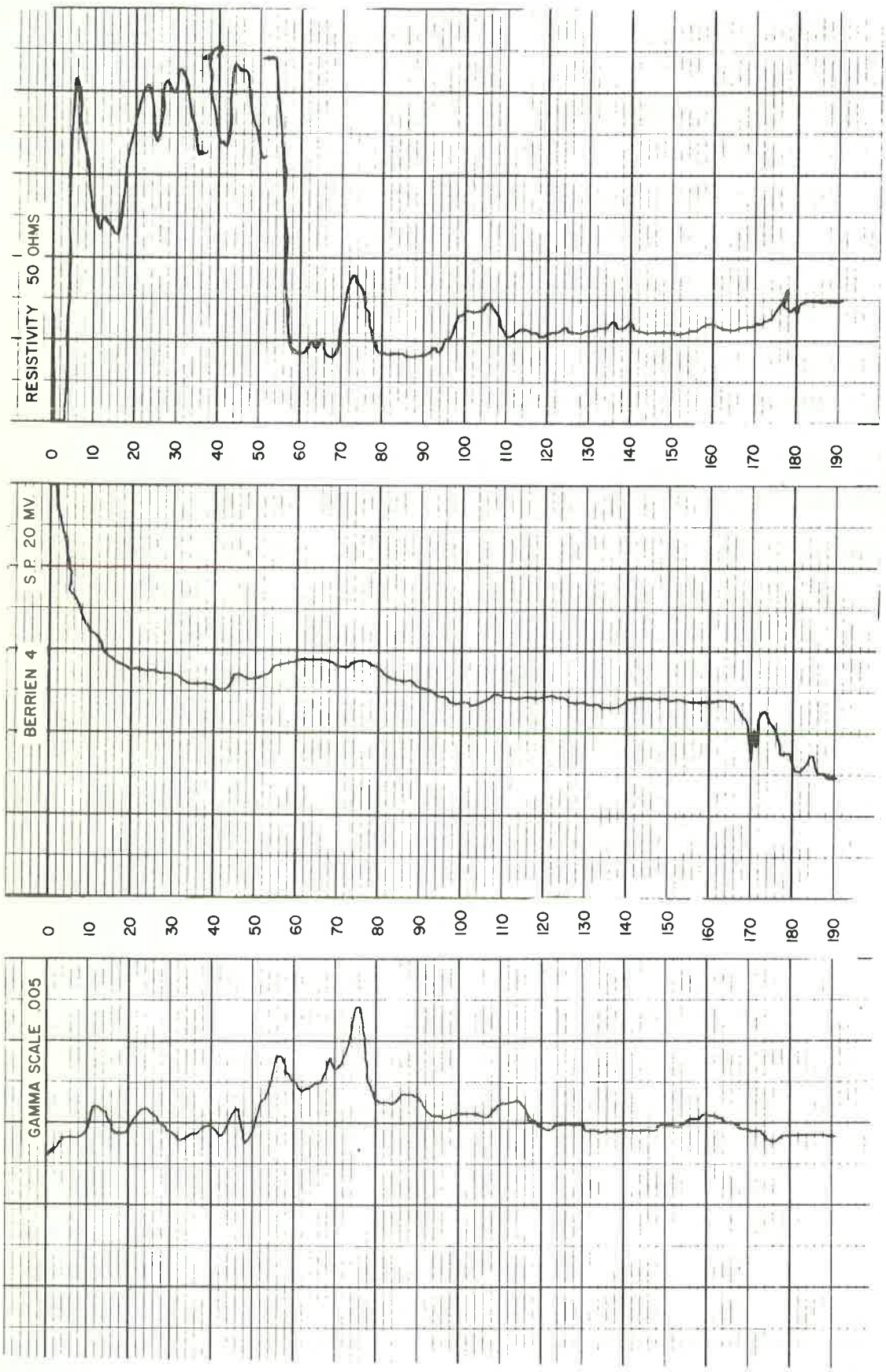


Figure BE-2. Electric and Gamma-Ray Logs - Berrien County Hole Be-4

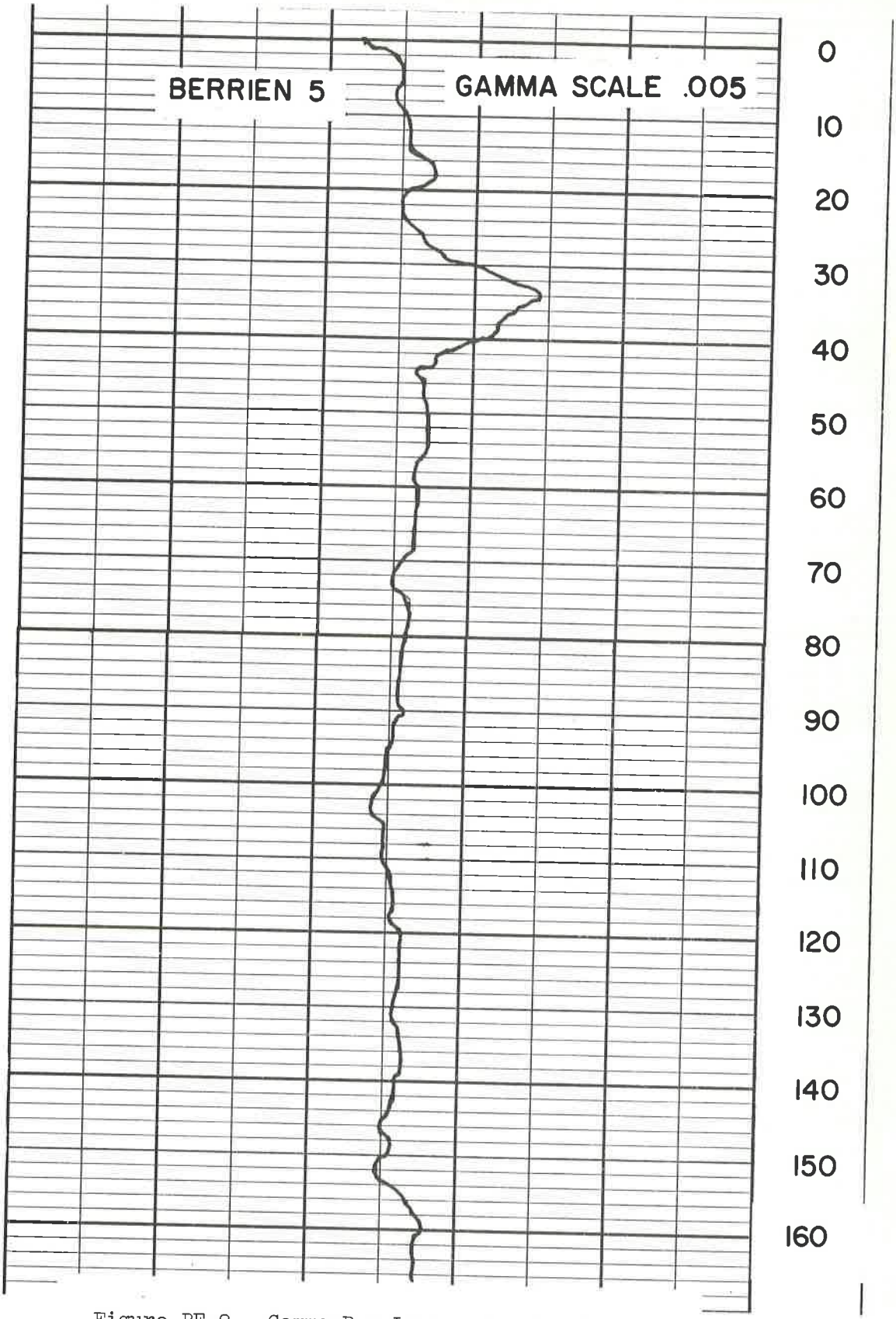


Figure BE-2. Gamma-Ray Logs - Berrien County
Hole Be-5

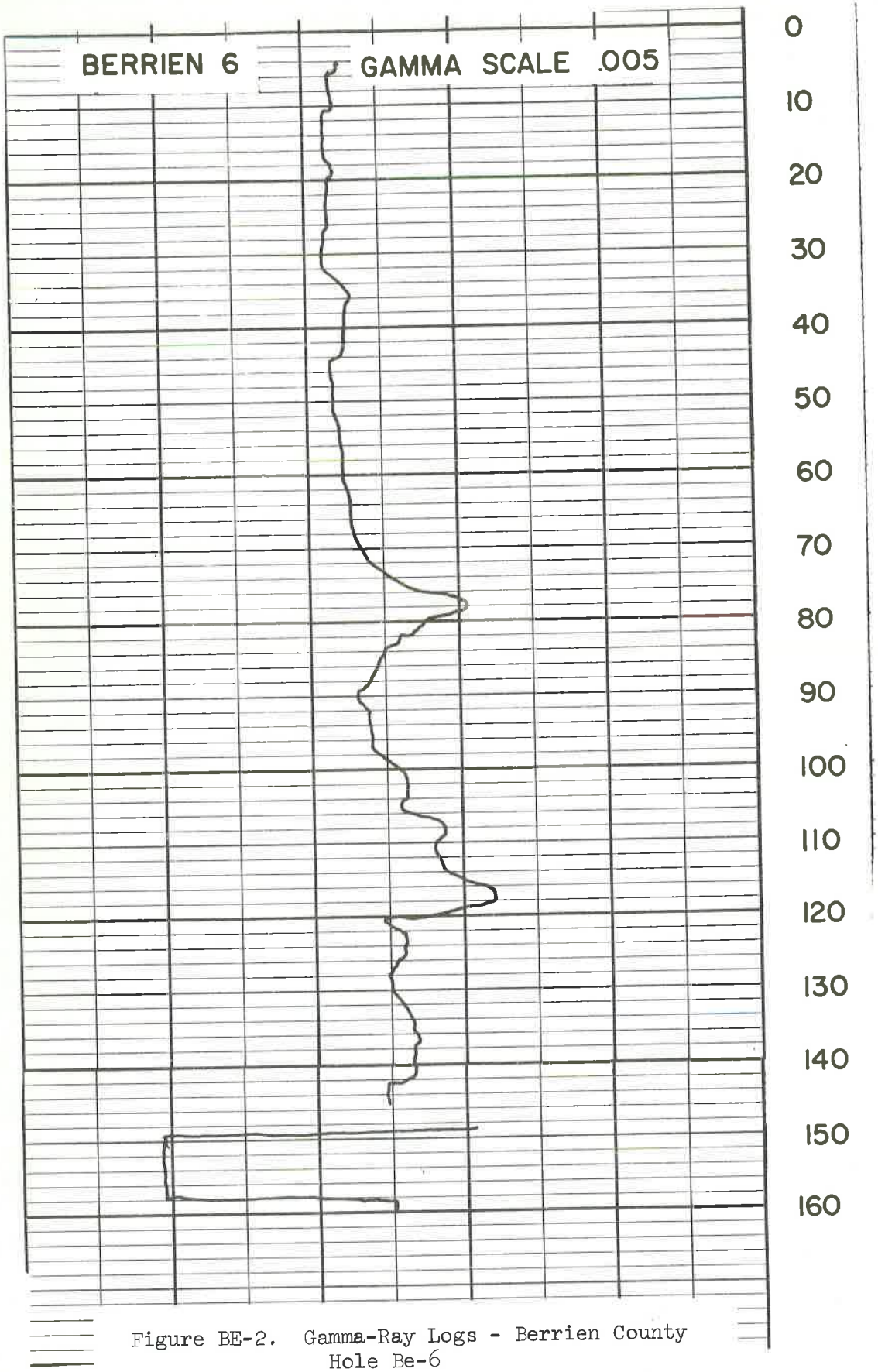


Figure BE-2. Gamma-Ray Logs - Berrien County
Hole Be-6

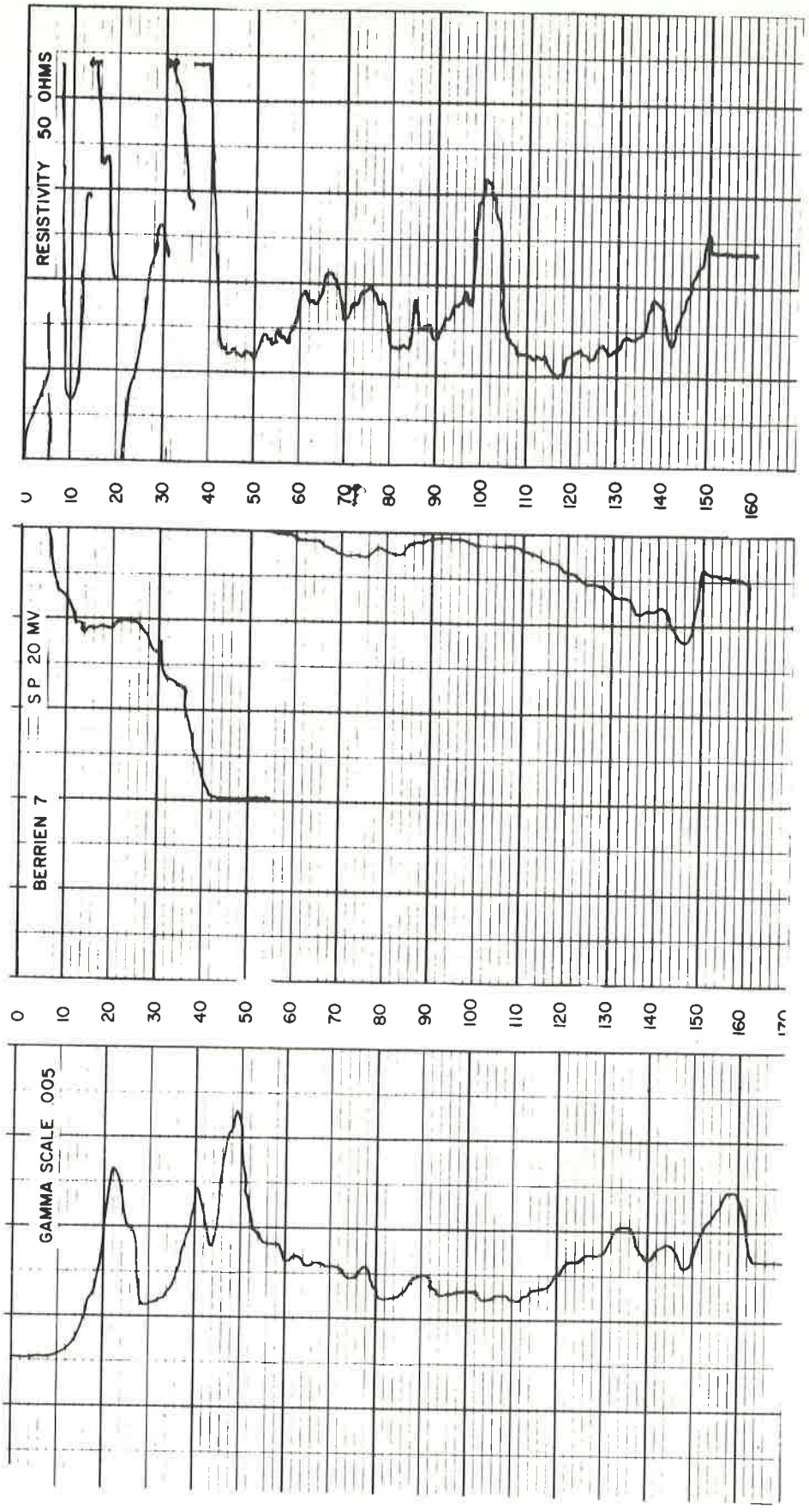


Figure BE-2. Electric and Gamma-Ray Logs - Berrien County
Hole Be-7

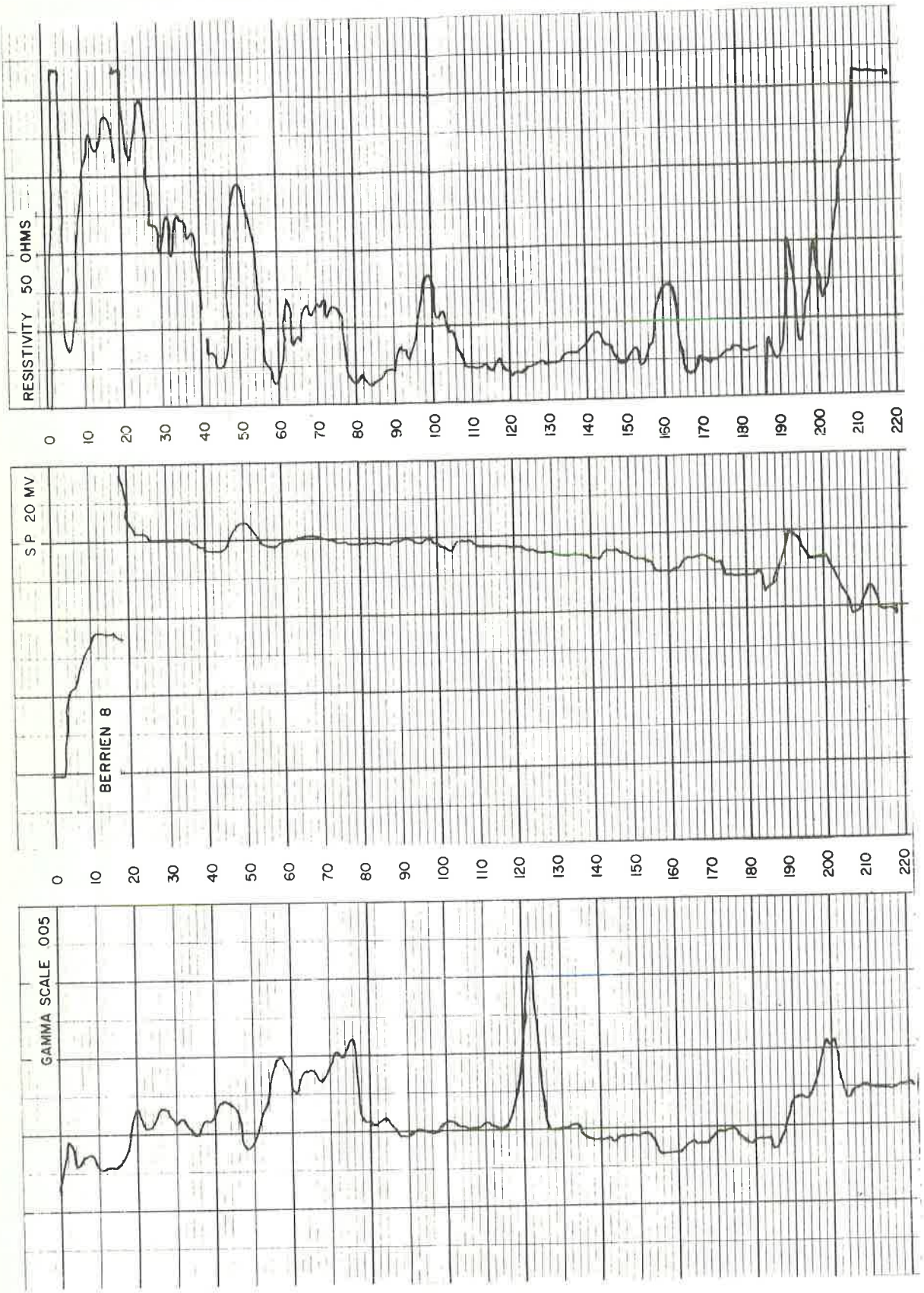


Figure PE-2. Electric and Gamma-Ray Logs - Berrien County
Hole Be-8

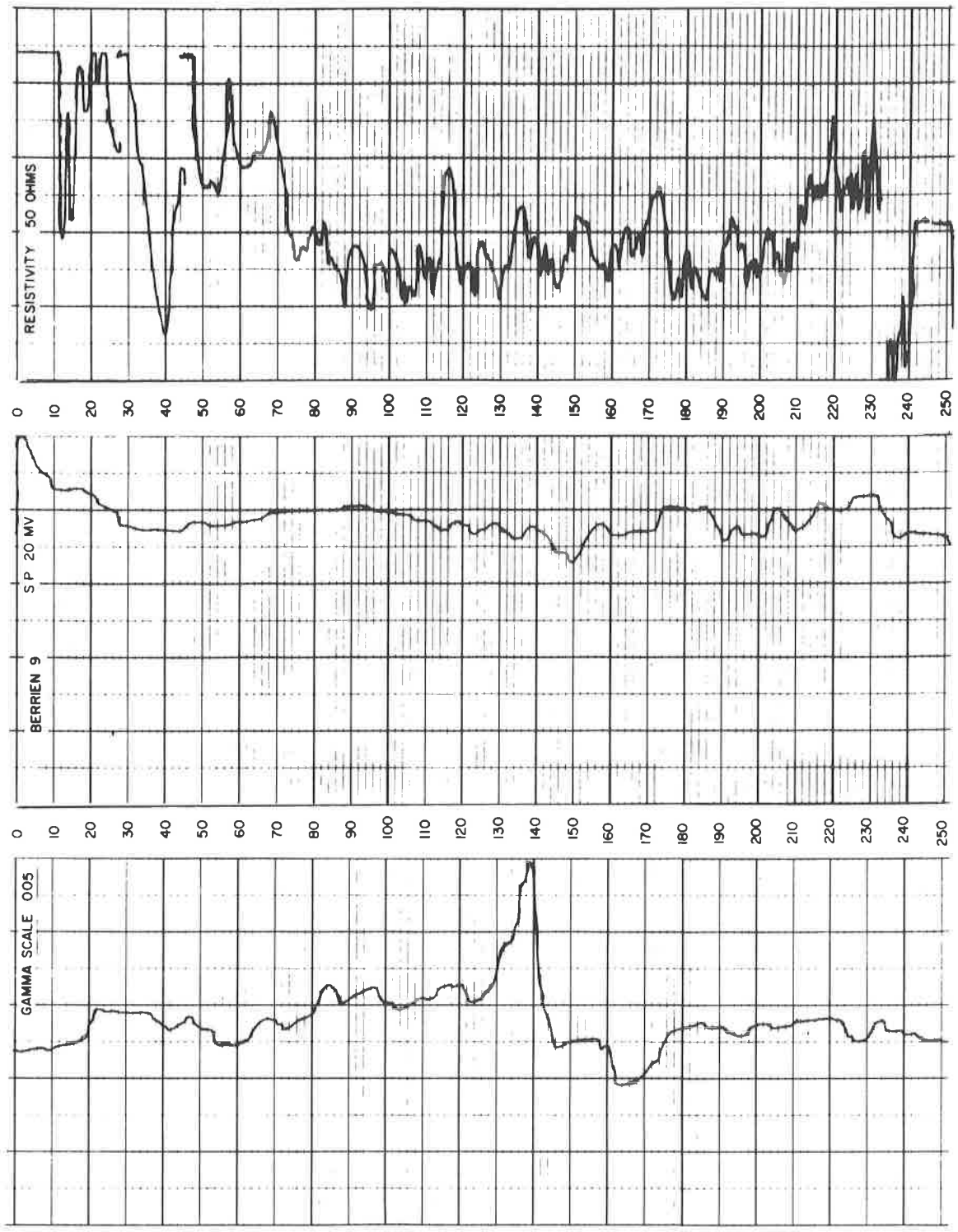


Figure BE-2. Electric and Gamma-Ray Logs - Berrien County
Hole Pe-9

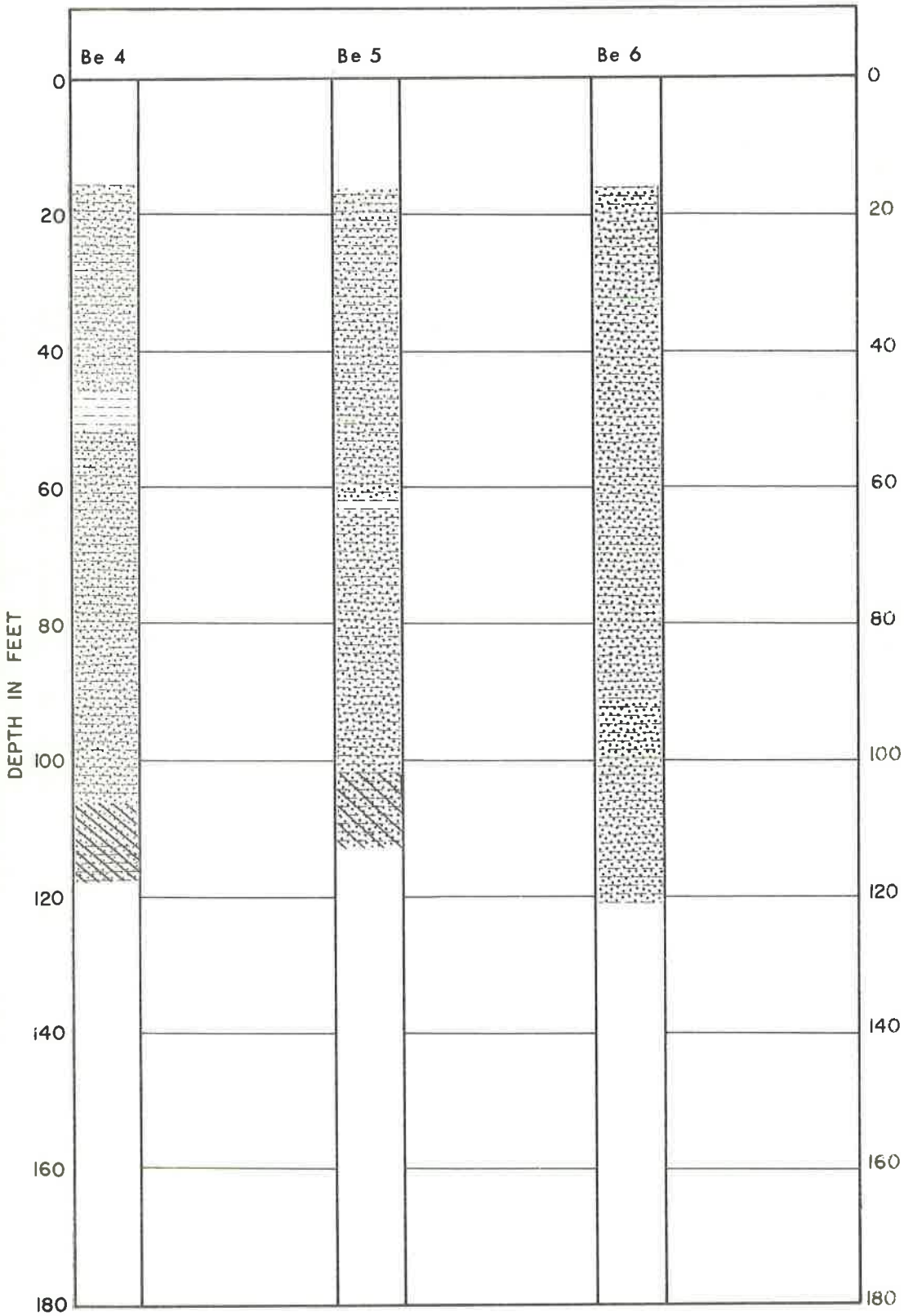


Figure Be-3. Lithologic Logs - Berrien County

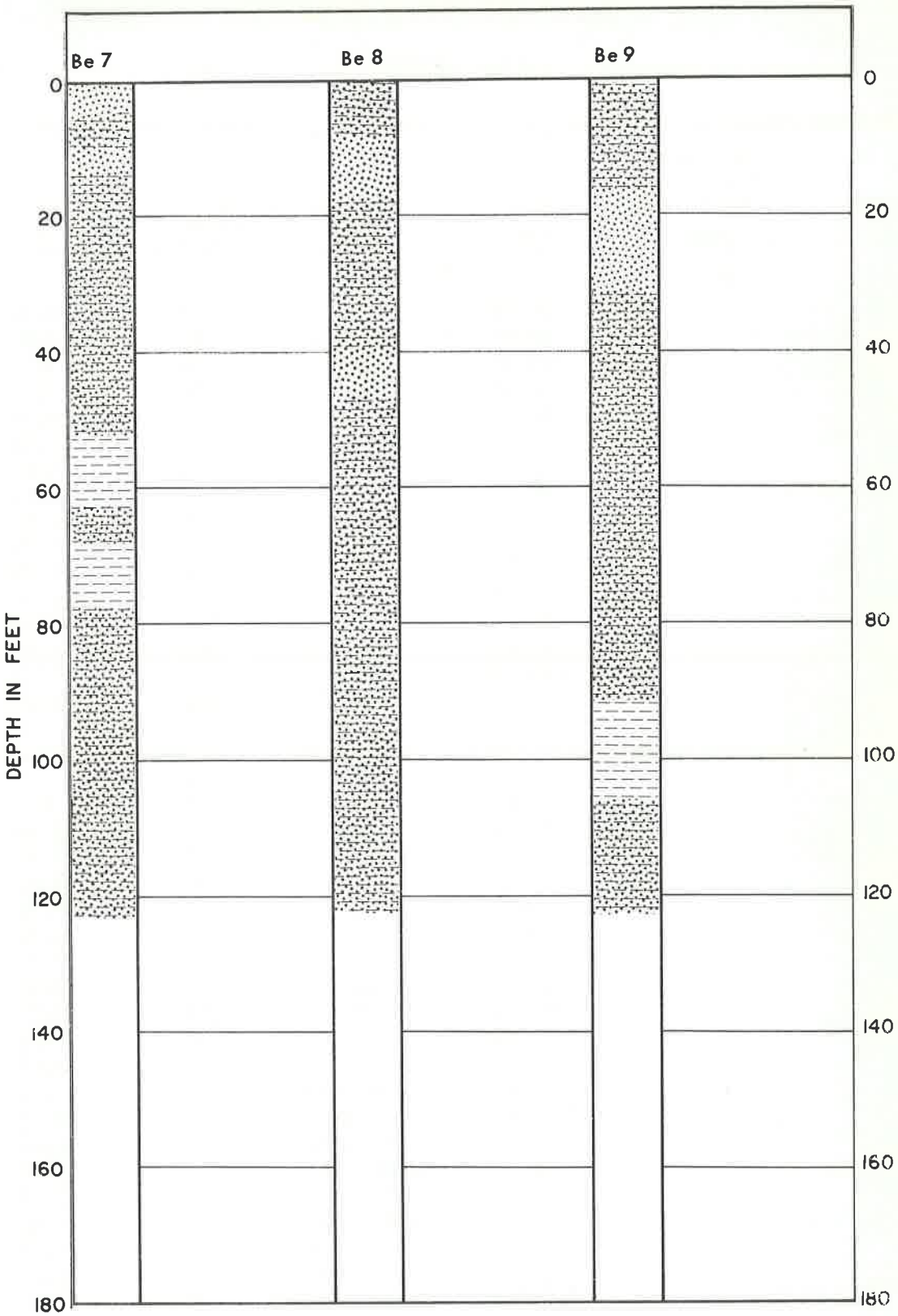


Figure Be-3. Lithologic Logs - Berrien County (Cont.)

TABLE BE-I

BPL DETERMINATION ON CORES

Berrien County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Be-4	207	0-16	-	-	-
		16-22	5	83	0.30
		22-29	4	57	1.89
		29-31	1	50	0
		31-36	5	100	0
		36-46	5	50	0.17
		46-51	5	100	0.81
		51-56	5	100	0.64
		56-61	5	100	0.20
		61-72	5	44	6.10
		72-77	5	100	6.81
		77-82	5	100	7.89
		82-87	5	100	5.56
		87-91	4	100	4.69
		91-106	12	80	4.62
		106-112	4	67	0.67
		112-117	5	100	0.71
Be-5	220	0-16	-	-	-
		16-31	10	67	0
		31-46	8	53	5.26
		46-61	11	73	5.90
		61-63	1	50	8.80
		63-68	5	100	6.54
		68-73	5	100	6.31
		73-76	3	100	8.09
		76-91	11	73	2.43
		91-102	9	82	2.70
		102-112	3	30	1.62
		112-122	8	80	2.66
		122-125	Wash Sample	-	1.96
		125-130	Wash Sample	-	2.53
		130-135	Wash Sample	-	2.29
		135-140	Wash Sample	-	3.20
		140-145	Wash Sample	-	2.66
		145-150	Wash Sample	-	2.87
		150-155	Wash Sample	-	1.96
		155-160	Wash Sample	-	1.75
		160-165	Wash Sample	-	-

(Continued)

TABLE BE-I (Continued)

BPL DETERMINATION ON CORES

BERRIEN COUNTY

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Be-5	220	165-170	Wash Sample	-	1.32
		170-175	Wash Sample	-	1.08
Be-6	201	0-5	Wash Sample	-	0
		5-10	Wash Sample	-	0
		10-15	Wash Sample	-	0
		16-21	5	100	0
		21-26	5	100	0
		26-31	5	100	0
		31-36	5	100	0
		36-41	5	100	0
		41-46	5	100	0
		46-51	5	100	0
		51-56	5	100	0
		56-61	5	100	0
		61-66	5	100	0
		66-76	10	100	.30
		76-91	15	100	1.08
		91-106	15	100	9.07
		106-121	15	100	12.38
		121-125	Wash Sample	-	8.94
		125-130	Wash Sample	-	6.91
		130-135	Wash Sample	-	8.60
		135-140	Wash Sample	-	4.72
		140-145	Wash Sample	-	5.06
		145-150	Wash Sample	-	5.06
		150-155	Wash Sample	-	6.20
		155-160	Wash Sample	-	-
		160-165	Wash Sample	-	4.89
Be-7	193	0-5	2	40	0
		5-8	2	67	0
		8-10	2	100	0
		10-13	1	33	0
		13-16	3	100	0
		16-19	3	100	0
		19-32	7	54	0
		32-47	8	53	0
		47-52	5	100	0
		52-62	4	40	0
		62-77	15	100	.44
		77-92	15	100	3.32

(Continued)

TABLE BE-I (Continued)

BPL DETERMINATION ON CORES

Berrien County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Be-7	193	92-107	12	80	5.90
		107-122	13	87	2.53
		122-125	Wash Sample	-	2.19
		125-130	Wash Sample	-	1.51
		130-135	Wash Sample	-	2.90
		135-140	Wash Sample	-	2.16
		140-145	Wash Sample	-	1.08
		145-150	Wash Sample	-	1.15
		150-155	Wash Sample	-	1.48
		155-160	Wash Sample	-	1.52
		160-165	Wash Sample	-	1.38
		165-170	Wash Sample	-	1.75
		170-175	Wash Sample	-	1.38
		175-180	Wash Sample	-	1.58
		180-185	Wash Sample	-	1.42
Be-8	245	0-3	2	67	0
		3-6	3	100	0
		6-9	2	67	0
		9-12	3	100	0
		12-18	6	100	0
		18-32	6	43	0
		32-40	8	100	0
		40-47	2	29	0
		47-62	5	33	0
		62-77	6	40	.67
		77-92	15	100	6.07
		92-98	4	67	1.01
		98-112	6	43	1.35
		112-122	10	100	3.03
		122-125	Wash Sample	-	1.01
		125-130	Wash Sample	-	2.70
		130-135	Wash Sample	-	3.37
		135-140	Wash Sample	-	4.05
		140-145	Wash Sample	-	2.70
		145-150	Wash Sample	-	4.38
		150-155	Wash Sample	-	3.71
		155-160	Wash Sample	-	2.02
		160-165	Wash Sample	-	1.01
		165-170	Wash Sample	-	1.72
		170-175	Wash Sample	-	1.01
		175-180	Wash Sample	-	1.01
		180-185	Wash Sample	-	1.35

(Continued)

TABLE BE-I (Continued)

BPL DETERMINATION ON CORES

Berrien County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Be-8	245	185-190	Wash Sample	-	0
		190-195	Wash Sample	-	2.70
		195-200	Wash Sample	-	.67
		200-205	Wash Sample	-	.67
		205-210	Wash Sample	-	1.01
		210-215	Wash Sample	-	1.69
Be-9	220	0-3	2	67	0
		3-6	3	100	0
		6-9	2	67	0
		9-12	3	100	0
		12-16	4	100	0
		16-31	1	7	0
		31-36	5	100	0
		36-46	5	50	0
		46-61	15	100	0
		61-76	15	100	0
		76-91	15	100	0
		91-106	15	100	0
		106-121	15	100	0
		121-125	Wash Sample	-	0
		125-130	Wash Sample	-	0
		130-135	Wash Sample	-	0
		135-140	Wash Sample	-	0
		140-145	Wash Sample	-	1.82
		145-150	Wash Sample	-	2.22
		150-155	Wash Sample	-	2.33
		155-160	Wash Sample	-	1.04
		160-165	Wash Sample	-	0.71
		165-170	Wash Sample	-	2.36
		170-175	Wash Sample	-	2.12
		175-180	Wash Sample	-	1.85
		180-185	Wash Sample	-	0.88
		185-190	Wash Sample	-	2.19
		190-195	Wash Sample	-	4.28
		195-200	Wash Sample	-	3.94
		200-205	Wash Sample	-	1.58
		205-210	Wash Sample	-	1.75
		210-215	Wash Sample	-	2.02

(Continued)

TABLE BE-I (Continued)

BPL DETERMINATION ON CORES

Berrien County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Be-9	220	215-220	Wash Sample	-	2.36
		220-225	Wash Sample	-	2.26
		225-230	Wash Sample	-	2.83
		230-235	Wash Sample	-	2.63
		235-240	Wash Sample	-	1.18
		240-245	Wash Sample	-	3.17
		245-250	Wash Sample	-	1.62
		250-255	Wash Sample	-	1.79
		255-260	Wash Sample	-	2.93
		260-265	Wash Sample	-	3.84
		265-270	Wash Sample	-	3.88
		270-275	Wash Sample	-	7.01
		275-280	Wash Sample	-	8.70
		280-285	Wash Sample	-	8.16
		285-290	Wash Sample	-	6.64
		290-295	Wash Sample	-	6.24

TABLE BE-II

MATRIX BENEFICIATION RESULTS

BERRIEN COUNTY

HOLE NO. BE-06 MATRIX INTERVAL = 91-121

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	30										
DRY DENSITY LB/CU FT	74.70										
PERCENT DRY WEIGHT	100.0	.61	1.11	2.22	50.78	6.40	44.38	45.27	10.85	83.92	5.23
PERCENT BPL	11.97	51.43	63.23	54.46	12.31	22.26	9.44	7.71	75.54	.84	7.08
PERCENT ACID INSOL	79.57	17.57	16.26	29.71	85.75	72.41	88.52	77.48	8.42	97.97	91.30
PERCENT IRON OXIDE	3.56	14.08	3.91	2.94	.47	.69	.49	6.91	.78	.18	1.64
PERCENT ALUM OXIDE	4.87	2.14	1.94	2.46	1.29	1.12	1.31	9.11	1.37	.94	3.21
PERCENT CALC OXIDE	7.00	31.48	37.78	32.88	5.60	12.94	4.90	6.21	50.40	.70	7.34

TABLE BE-III

ECONOMIC FACTORS - FIGURES OF MERIT

INDIVIDUAL MATRICES WELL NO. BE-06

MATRIX NO.		1
DEPTH INTERVAL, FT.		91-121
ECONOMIC FACTORS *	UNIT (M=1000)	
* OVERBURDEN	FT.	91.00
	MT/AC	178.4
* MATRIX	FT.	30.00
	MT/AC	48.8
* BPL IN MATRIX	PERCENT	11.97
	MT/AC	5.8
* OVERBURDEN/MATRIX	RATIO	3.03
WASH-SCREEN PRODUCTS		
+16 MESH	MT/AC	1.9
-16+150 MESH	MT/AC	24.8
-150 MESH (LOSS)	MT/AC	22.1
* FLOTATION CONCENTRATE PRODUCT	MT/AC	2.7
TOTAL USEFUL PRODUCTS**	MT/AC	4.6
BPL RECOVERY		
+16 MESH	MT/AC	1.1
* -16+150 (FLOT. CONC.)	PERCENT BPL	75.5
* -16+150 (FLOT. CONC.)	MT/AC	2.0
* TOTAL	MT/AC	3.1
* RECOVERED FROM MATRIX	PERCENT	53.38
* OVERBURDEN / PRODUCT	CU YD/T	38.3
* MATRIX / PRODUCTS	CU YD/T	10.49
* I+A IN FLOT. CONC.	PERCENT	2.15

FIGURES OF MERIT	UNIT	ECON. LEVEL	
OVERBURDEN	FT	88 MAX	.97
MATRIX	FT	3 MIN	10.00
MATRIX BPL	PERCENT	10 MIN	1.20
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	1.14
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.45
OVERBURDEN/MATRIX	RATIO	2 MAX	.66
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	.46
I+A IN FLOT. CONC.	PERCENT	5 MAX	2.33
PRODUCTS RECOVERY	T/AC-FT	400 MIN	.38
BPL (+150) RECOVERY	PERCENT	63 MIN	.85
MATRIX/PRODUCTS	CU YD/T	6 MAX	.57

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

BROOKS COUNTY

BROOKS COUNTY

SUMMARY OF RESULTS

Brooks County holes 3 through 7 are reported herein. None of the holes contained sufficient phosphorite to warrant beneficiation tests.

Electric and gamma-ray logs were not run on holes Br-3, Br-5, and Br-7 because of a priority use of the logging equipment on the other drilling rig.

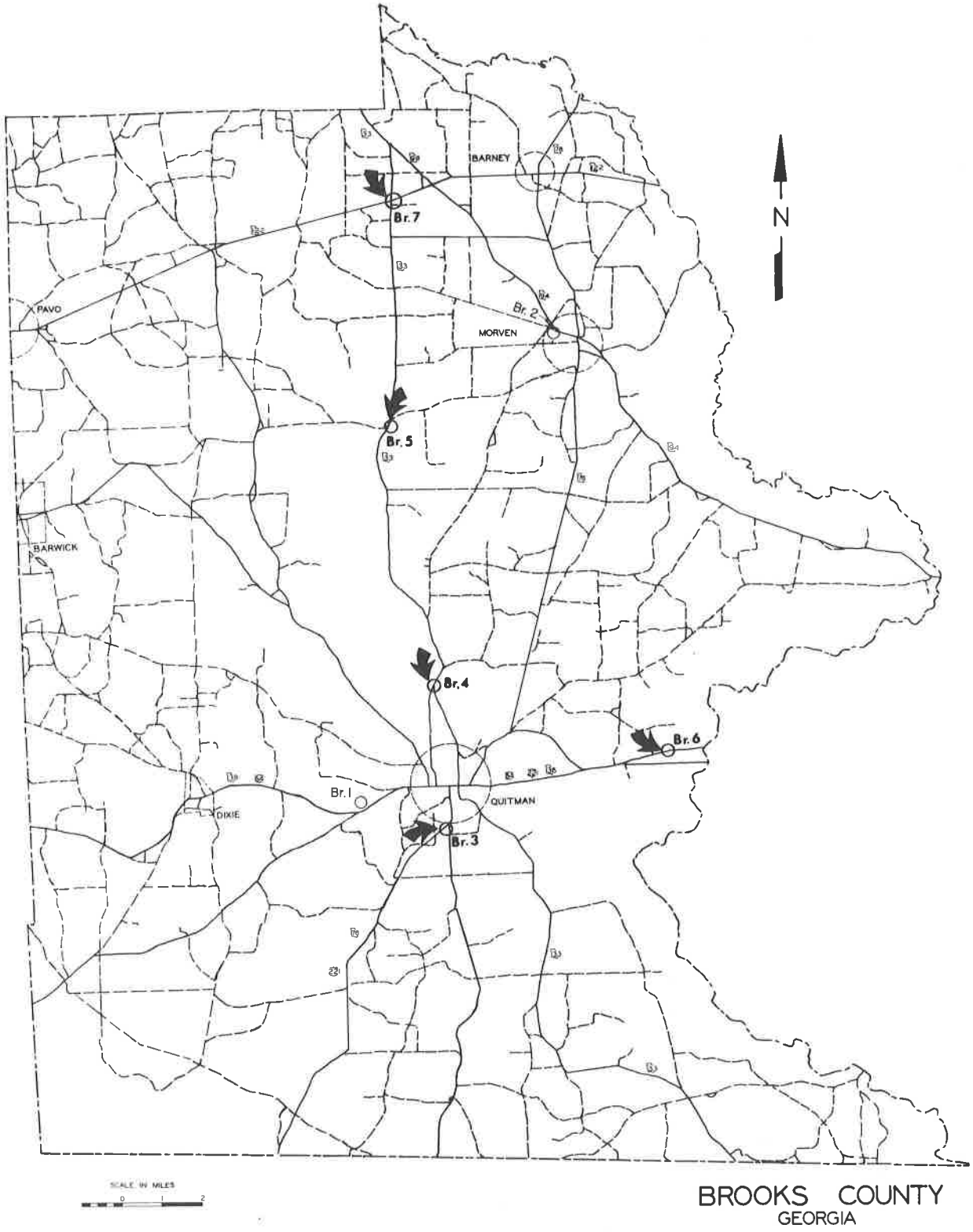


Figure BR-1. Location of Holes - Brooks County

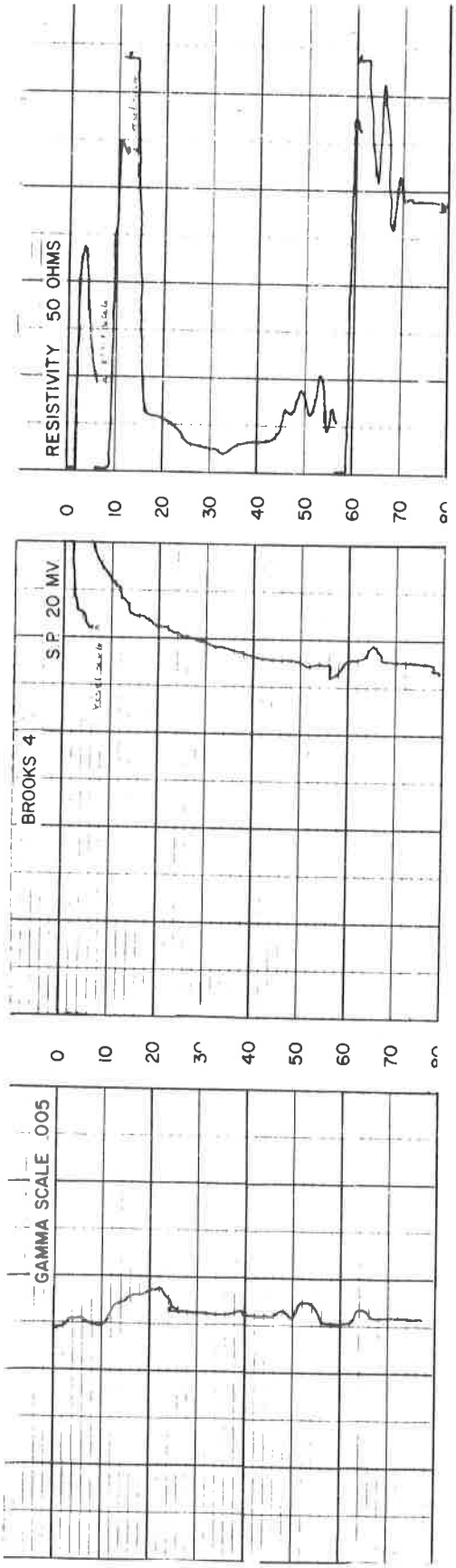


Figure BR-2. Electric and Gamma-Ray Logs - Brooks County
Hole Br-4

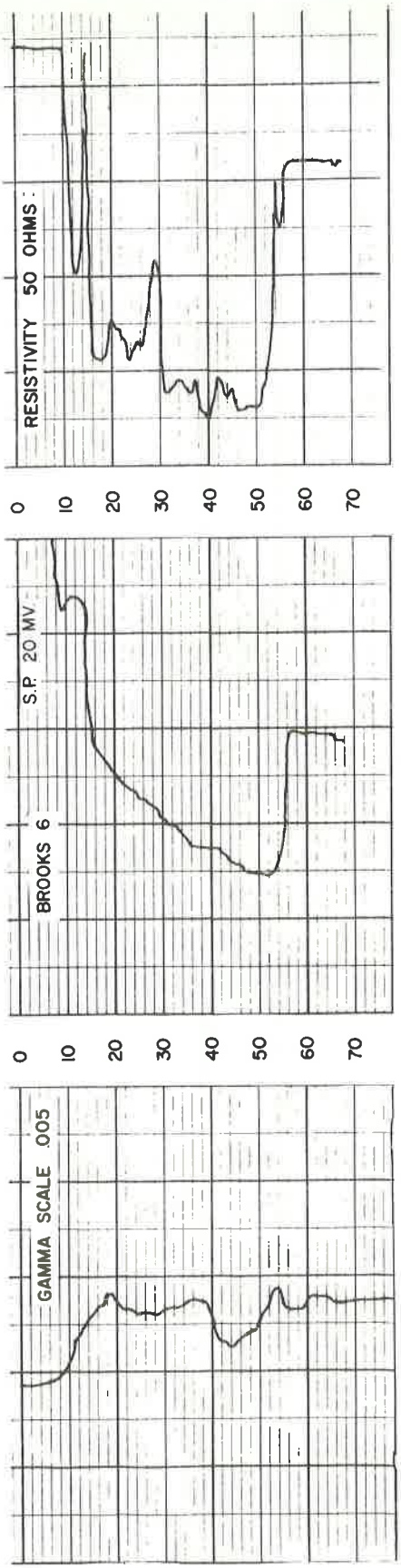


Figure BR-2. Electric and Gamma-Ray Logs - Brooks County
Hole Br-6

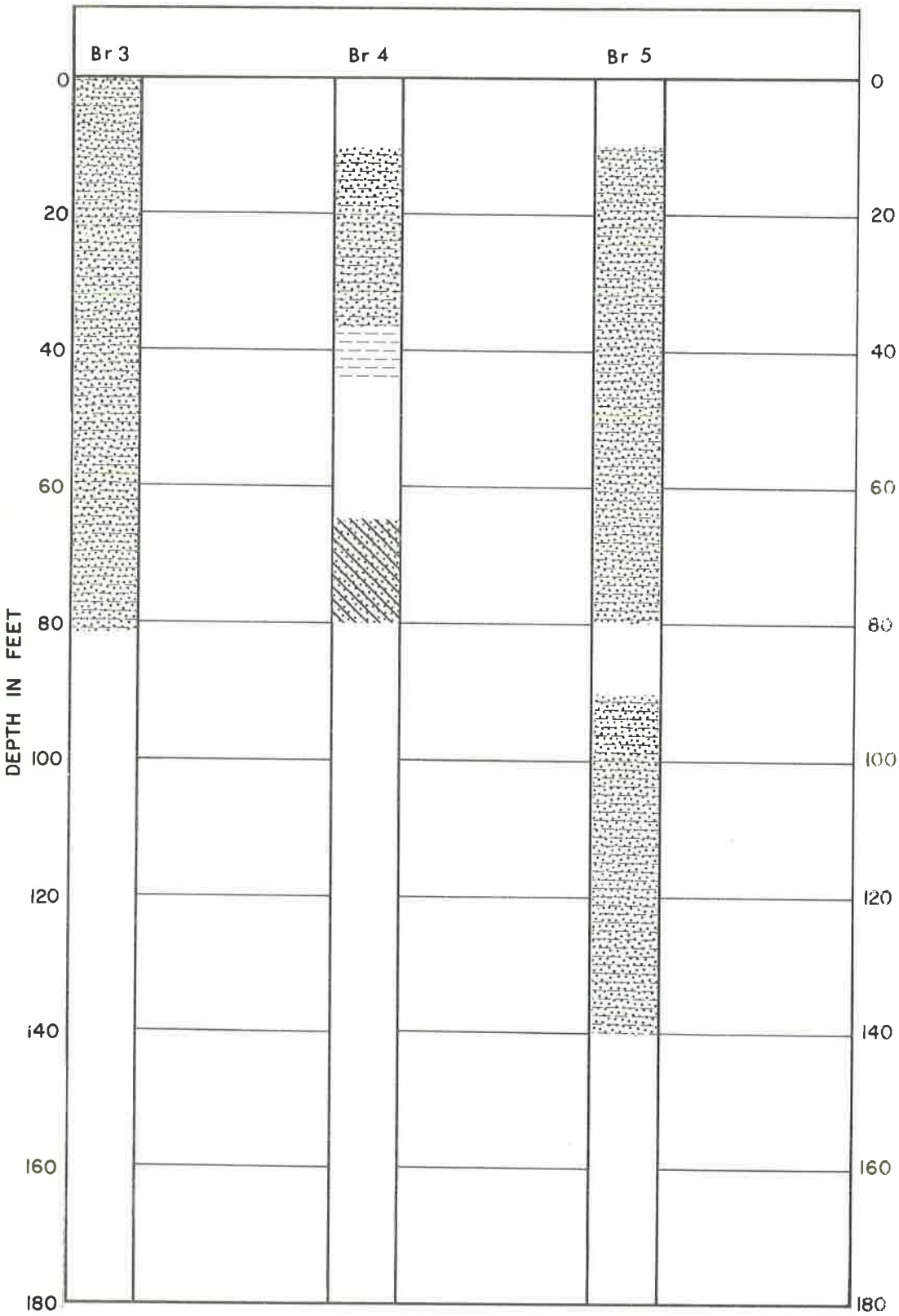


Figure Br-3. Lithologic Logs - Brooks County

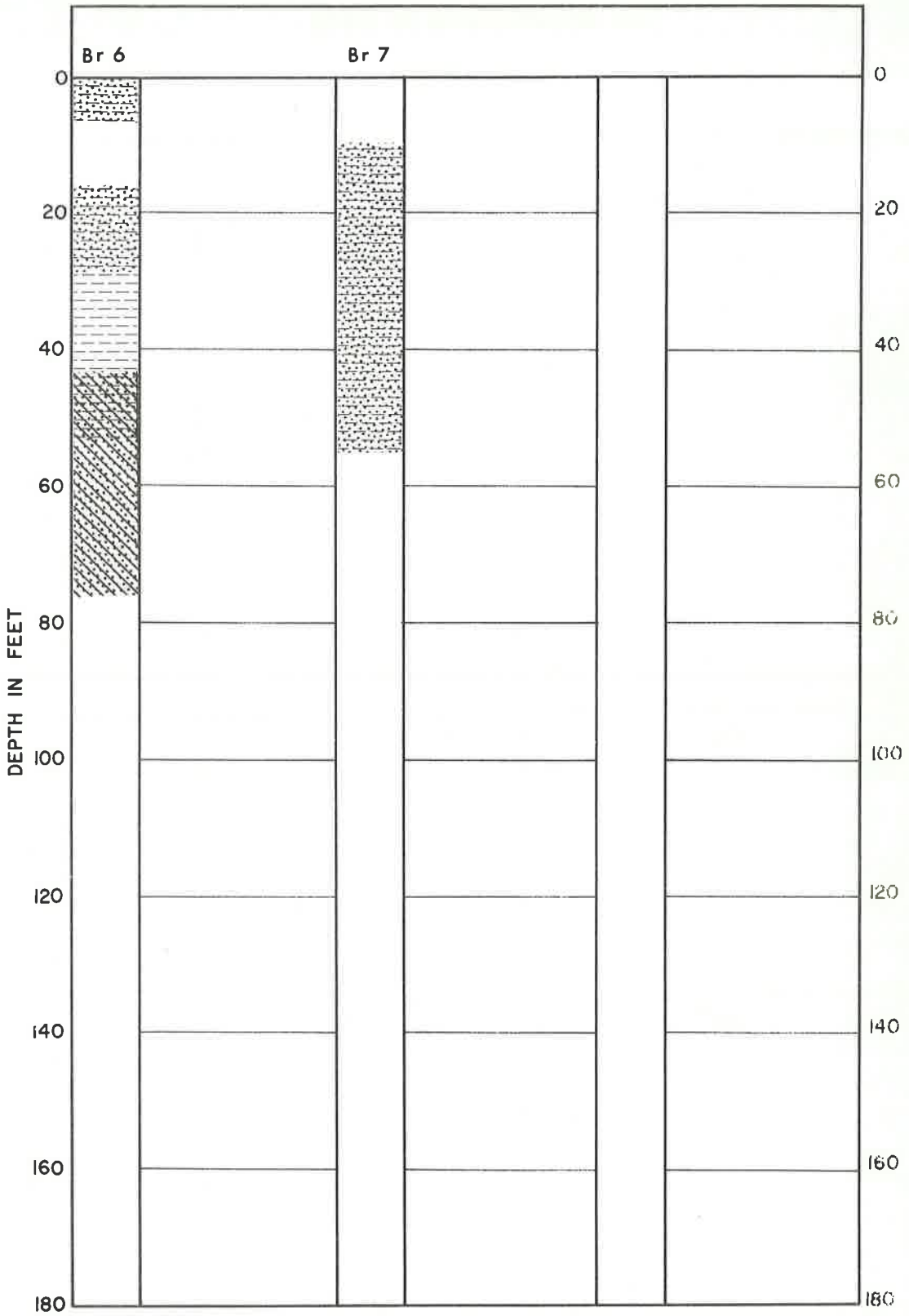


Figure Br-3. Lithologic Logs - Brooks County (Cont.)

TABLE BR-I

BPL DETERMINATION ON CORES

Brooks County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Br-3	205	0-3	2	67	0
		3-6	2	67	0
		6-9	2	67	0
		9-12	2	67	0
		12-22	3	30	0
		22-30	2	25	0
		30-40	3	30	1.35
		40-45	4	80	0.40
		45-50	4	80	0.67
		50-55	5	100	0.57
		55-60	4	80	4.18
		60-65	5	100	3.00
		65-70	3	60	3.07
		70-80	7	70	4.25
		80-90	10	100	9.51
Br-4	139	0-10	-	-	-
		10-20	7	70	0
		20-30	3	30	0
		30-35	5	100	1.75
		35-37	2	100	3.30
		37-45	8	100	1.01
		46-65	-	-	-
		65-75	6	60	0
		75-80	2	40	0
Br-5	202	0-10	-	-	-
		10-20	5	50	0
		20-25	5	100	0
		25-30	4	80	0
		30-35	5	100	5.06
		35-39	4	100	6.81
		39-40	1	100	1.18
		40-45	4	80	1.79
		45-50	5	100	1.96
		50-55	5	100	0
		55-60	3	60	0
		60-65	5	100	1.08

(Continued)

TABLE BR-I (Continued)

BPL DETERMINATION ON CORES

Brooks County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Br-5	202	65-70	5	100	1.69
		70-80	4	40	2.33
		80-90	-	-	-
		90-95	5	100	5.46
		95-100	5	100	4.38
		100-110	4	40	8.06
		110-120	6	60	4.38
		120-130	8	80	6.98
		130-140	1	10	9.68
Br-6	129	0-3	2	67	0
		3-6	2	67	0
		6-15	-	-	-
		15-28	12	92	1.38
		28-31	3	100	2.19
		31-43	10	83	1.69
		43-46	1	33	0.74
		46-53	4	57	0.94
		53-66	2	15	0
		66-76	5	50	0
Br-7	230	0-10	-	-	-
		10-20	10	100	0
		20-30	10	100	3.37
		30-40	10	100	4.89
		40-45	5	100	5.87
		45-55	4	40	2.12
		58	W.S.	-	2.70

BULLOCH COUNTY

BULLOCH COUNTY

SUMMARY OF RESULTS

The two Bulloch County holes were chosen to test economic possibilities of relatively near surface phosphorite as reported in GGS wells numbers 432 and 553. Neither had sufficient phosphorite for beneficiation testing.

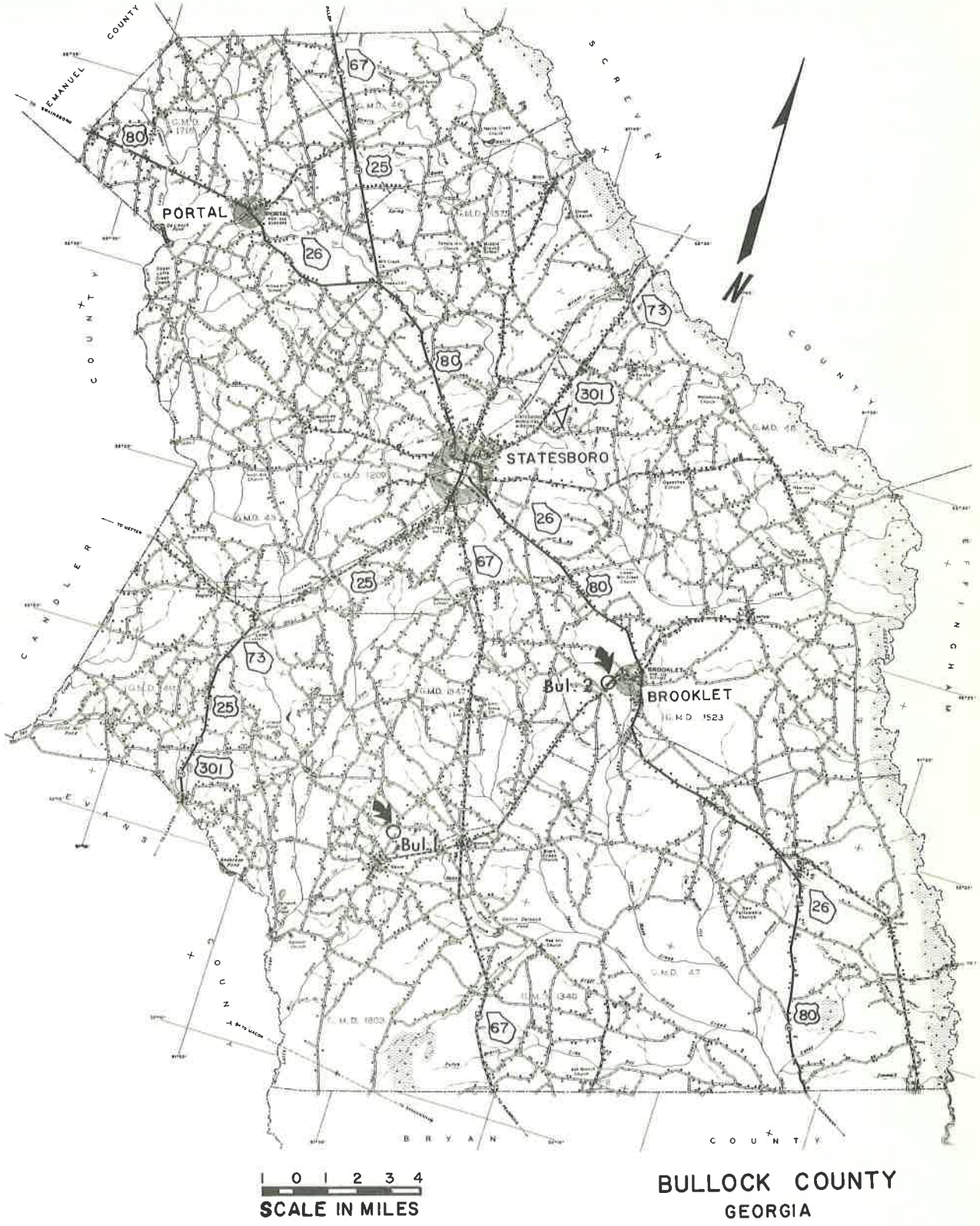


Figure BUL-1. Location of Holes - Bulloch County

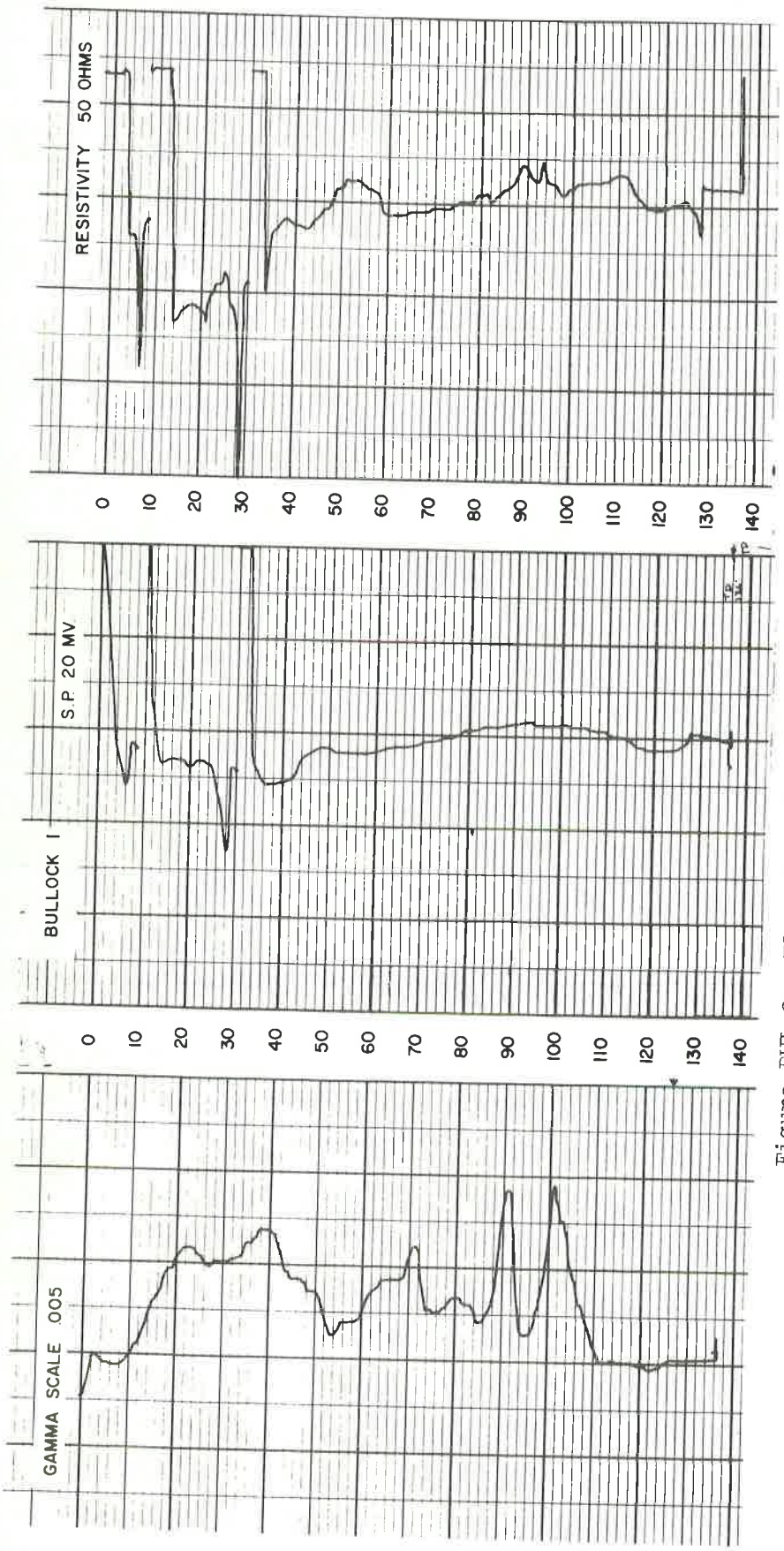


Figure RUL-2. Electric and Gamma-Ray Logs - Bulloch County Hole Bul-1

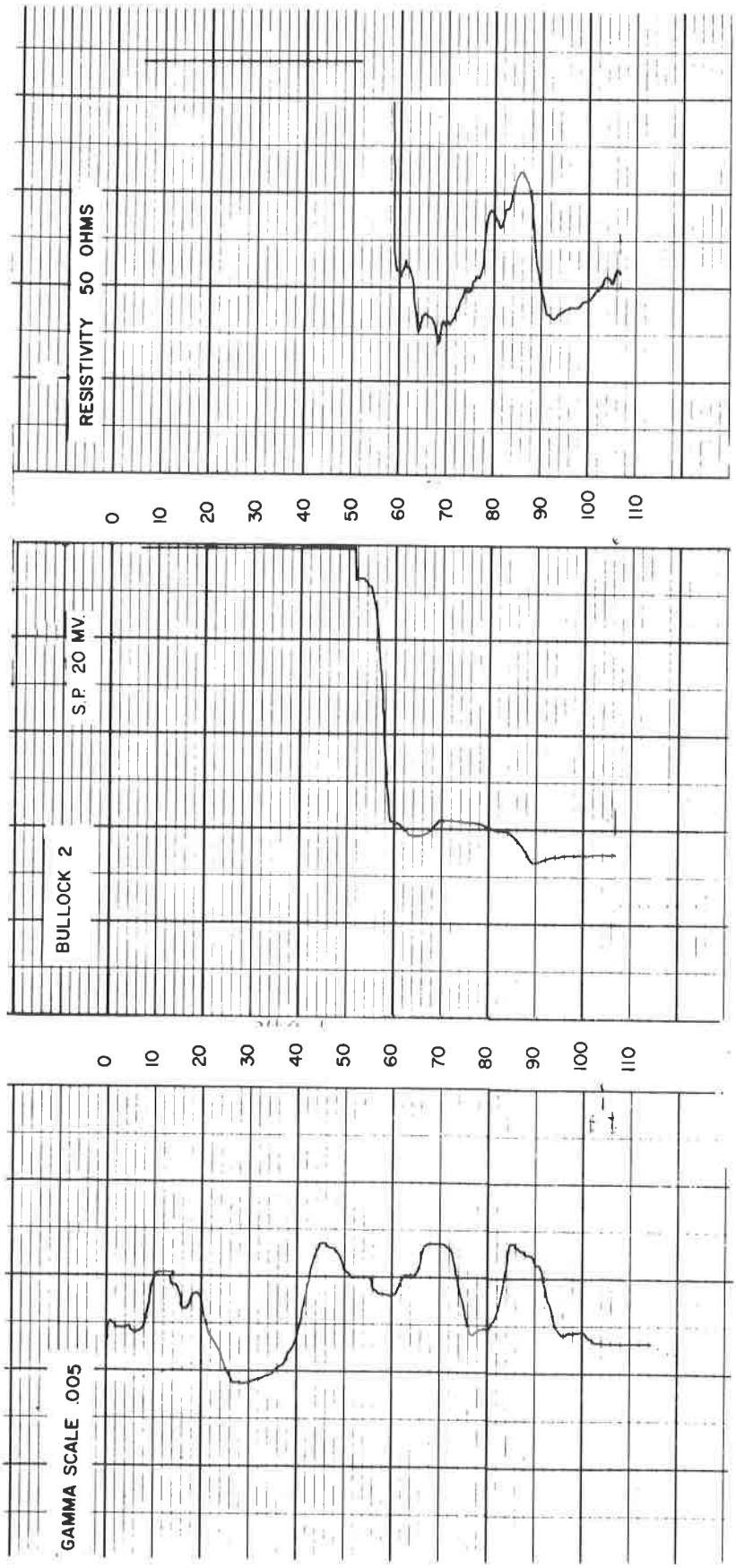


Figure BUL-2. Electric and Gamma-Ray Logs - Bulloch County
Hole Bul-2

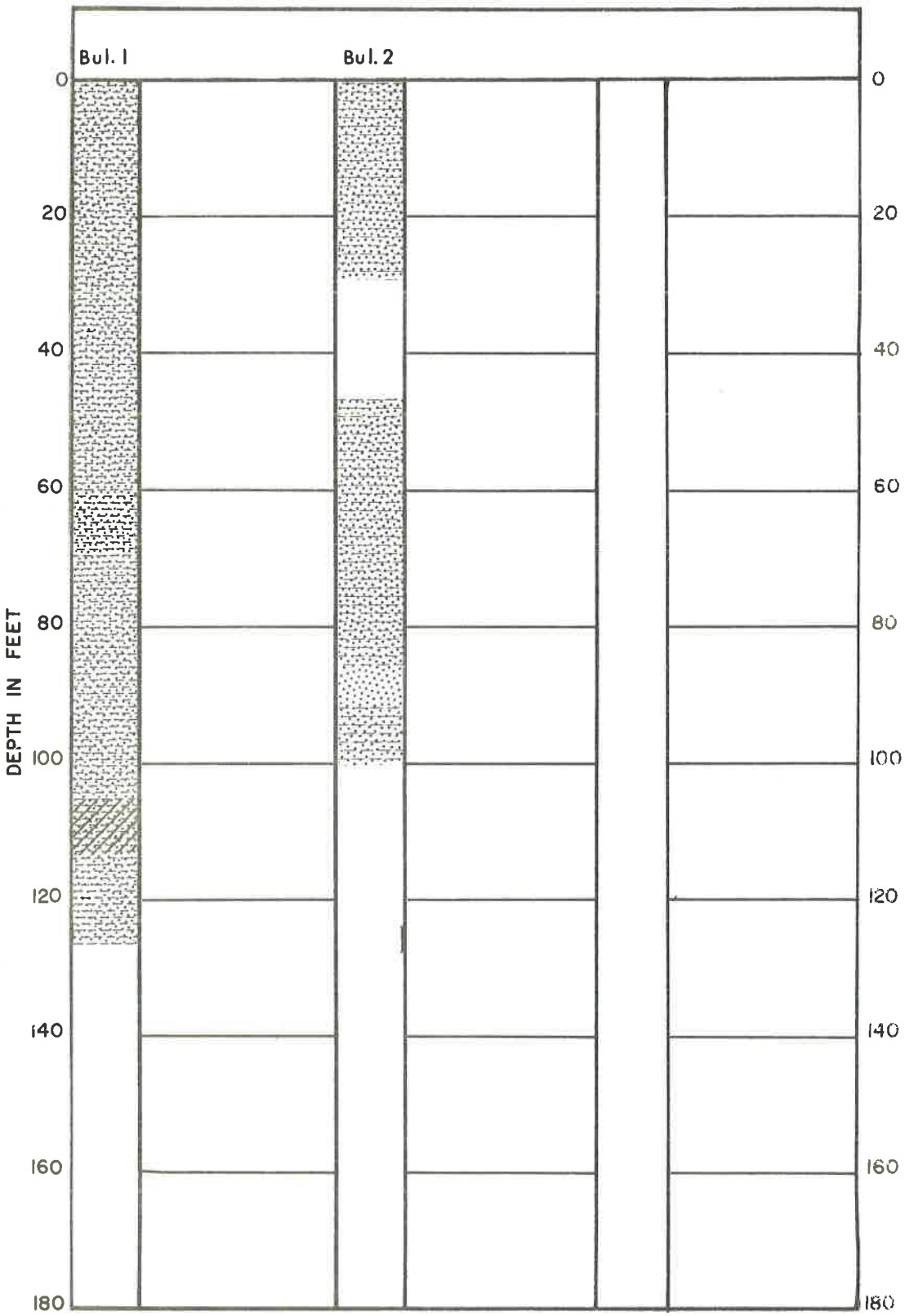


Figure BUL-3. Lithologic Logs - Bulloch County

TABLE BUL-I

BPL DETERMINATION ON CORES

Bulloch County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Bul-1	185	0-3	3	100	0
		3-9	6	100	0
		9-12	1	33	0
		12-15	3	100	0
		15-17	2	100	0
		17-30	13	77	0
		30-41	7	64	0
		41-45	4	100	0
		45-60	15	100	0
		60-75	15	100	0
		75-90	6	40	0
		90-104	14	100	0
		104-112	8	100	2.70
		112-125	13	100	2.36
Bul-2	165	0-16	12	75	0
		16-29	11	85	0
		46-61	15	100	0
		61-75	9	64	0
		75-85	10	100	0
		85-90	5	100	0
		90-100	10	100	0

CHATHAM COUNTY

CHATHAM COUNTY

SUMMARY OF RESULTS

Chatham County holes 4A, 10, 11, 12, and 13 were drilled to give additional information for the State of Georgia in its consideration of a lease application by the Kerr-McGee Corporation for off-shore lands. These holes confirmed the existence of a phosphorite ore body that averages 65-67 percent BPL on beneficiation. The ore is similar in character to the North Carolina phosphorites that are being mined by the Texas-Gulf Corporation.

The depth of the holes permitted determination of the thickness of the aquiclude over one of the principal aquifers of the region. Due to cave-in of holes Ch-4A and Ch-11, electric logs were not run on these holes. Gamma-ray logs were run from inside the drill pipe. The electrical log was not run on Ch-10 because of the close proximity of a local power line and consequent electrical disturbances, but the gamma-ray was run.

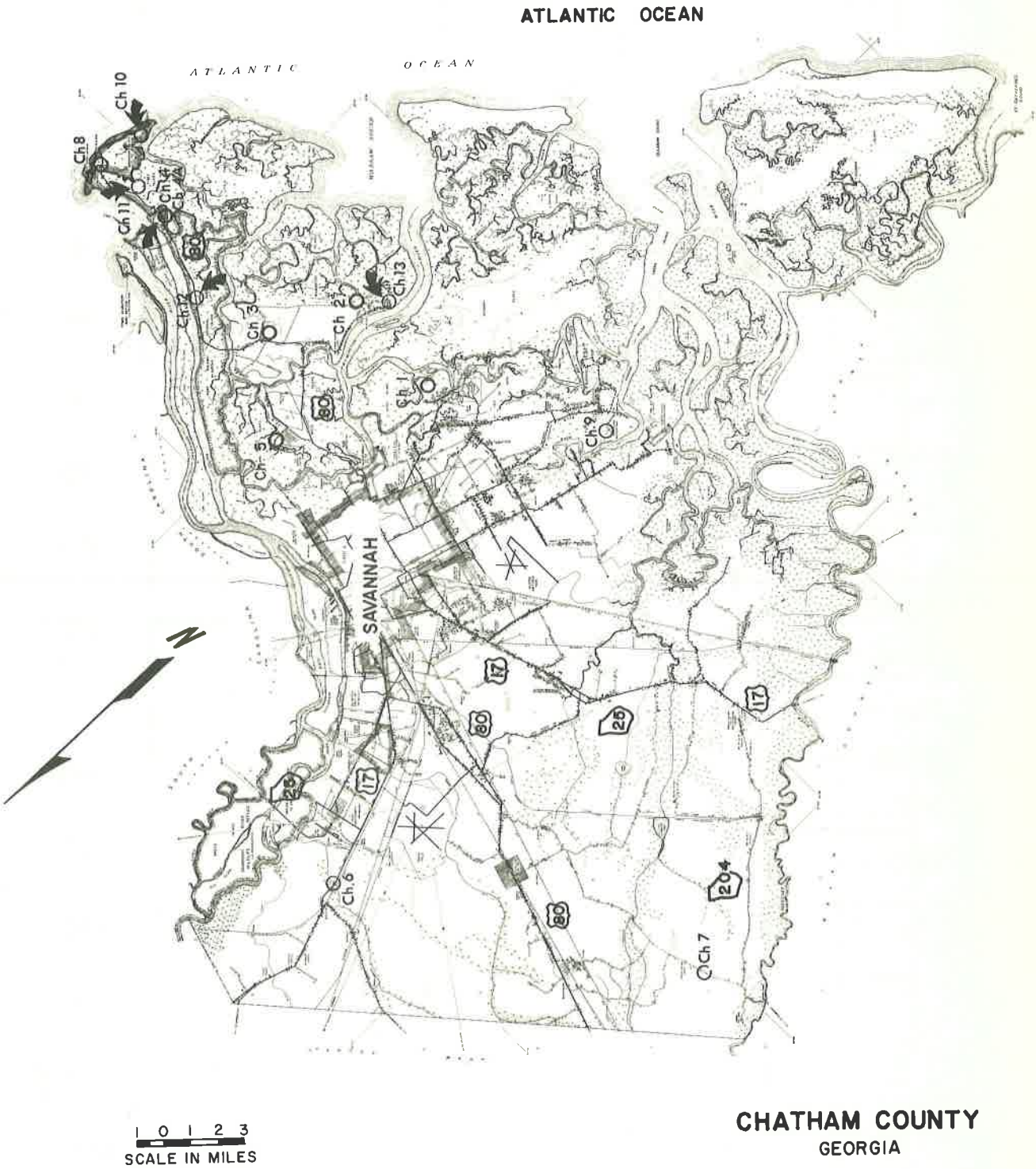


Figure CH-1. Location of Holes - Chatham County

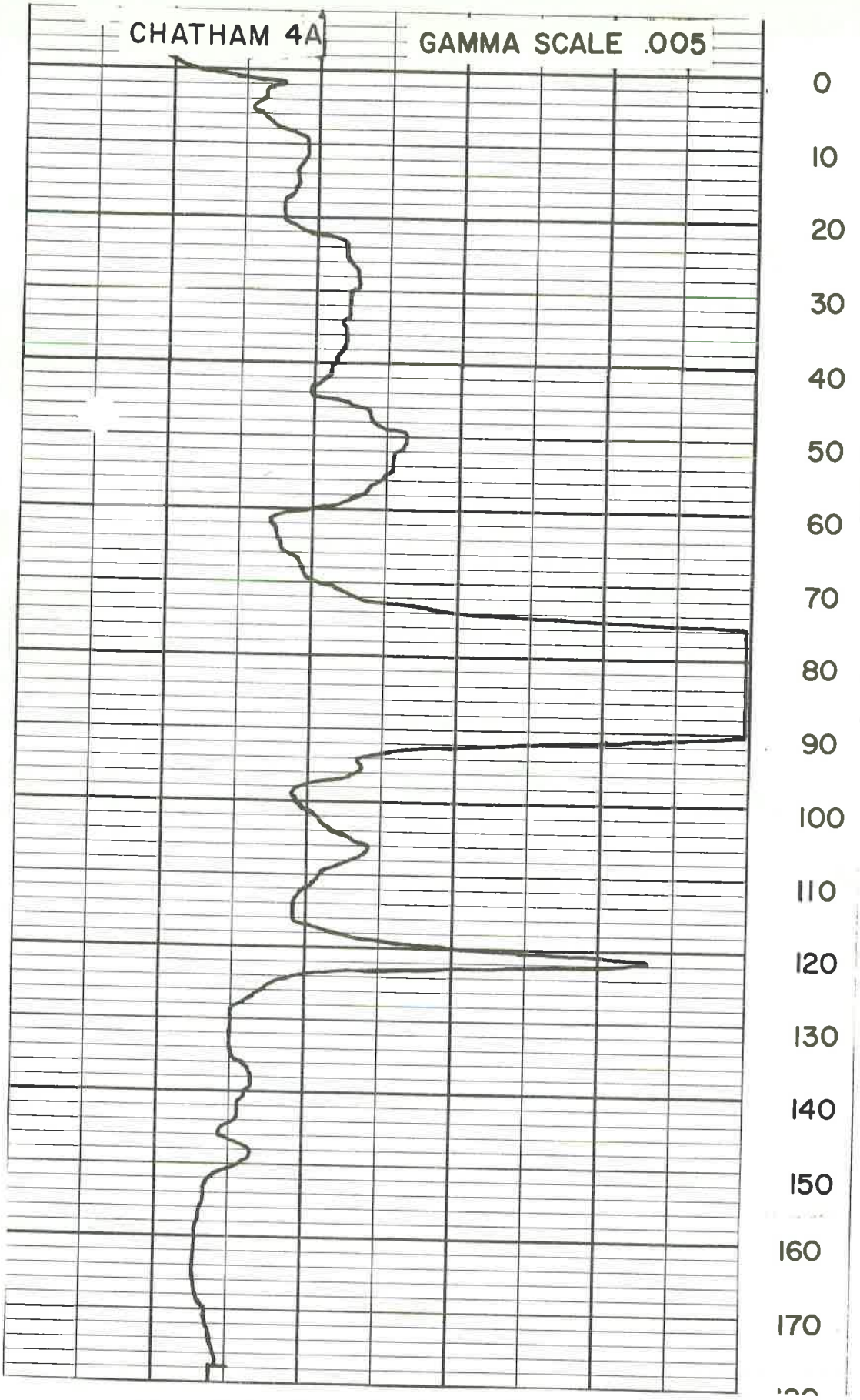


Figure CH-2. Gamma-Ray Logs - Chatham County
Hole Ch-4A

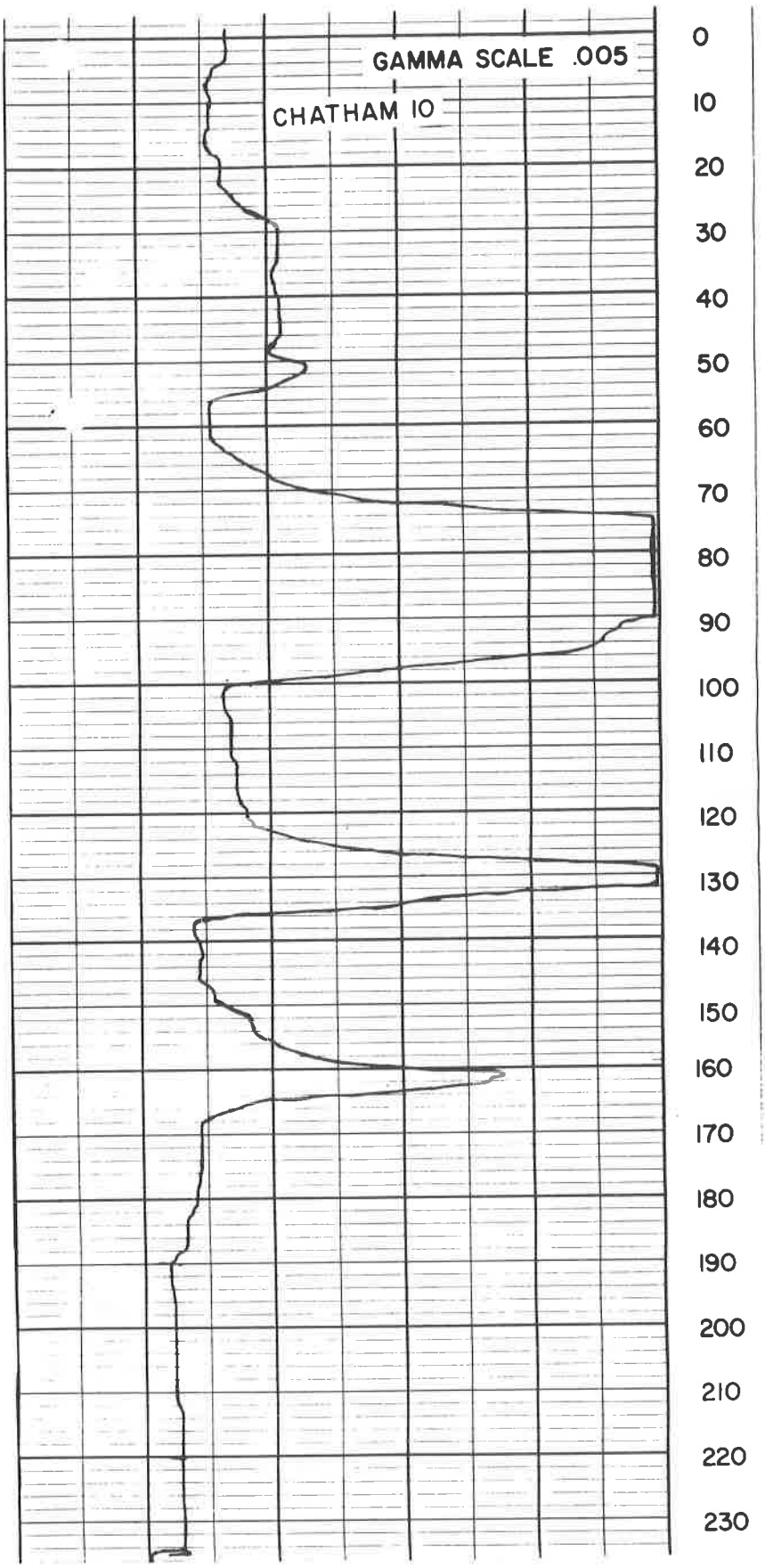


Figure CH-2. Gamma-Ray Logs - Chatham County
Hole Ch-10

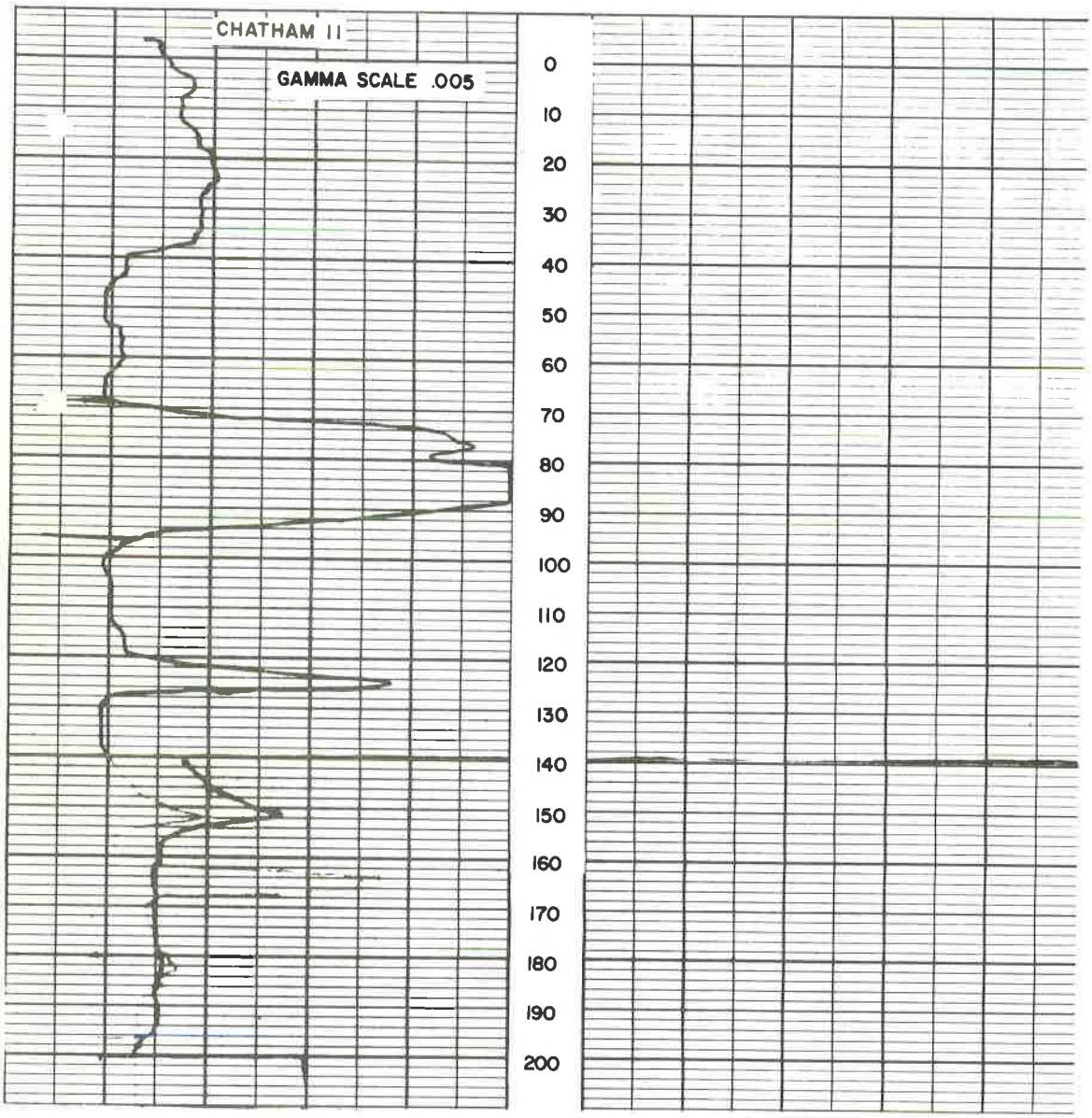


Figure CH-2. Gamma-Ray Logs - Chatham County
Hole Ch-11

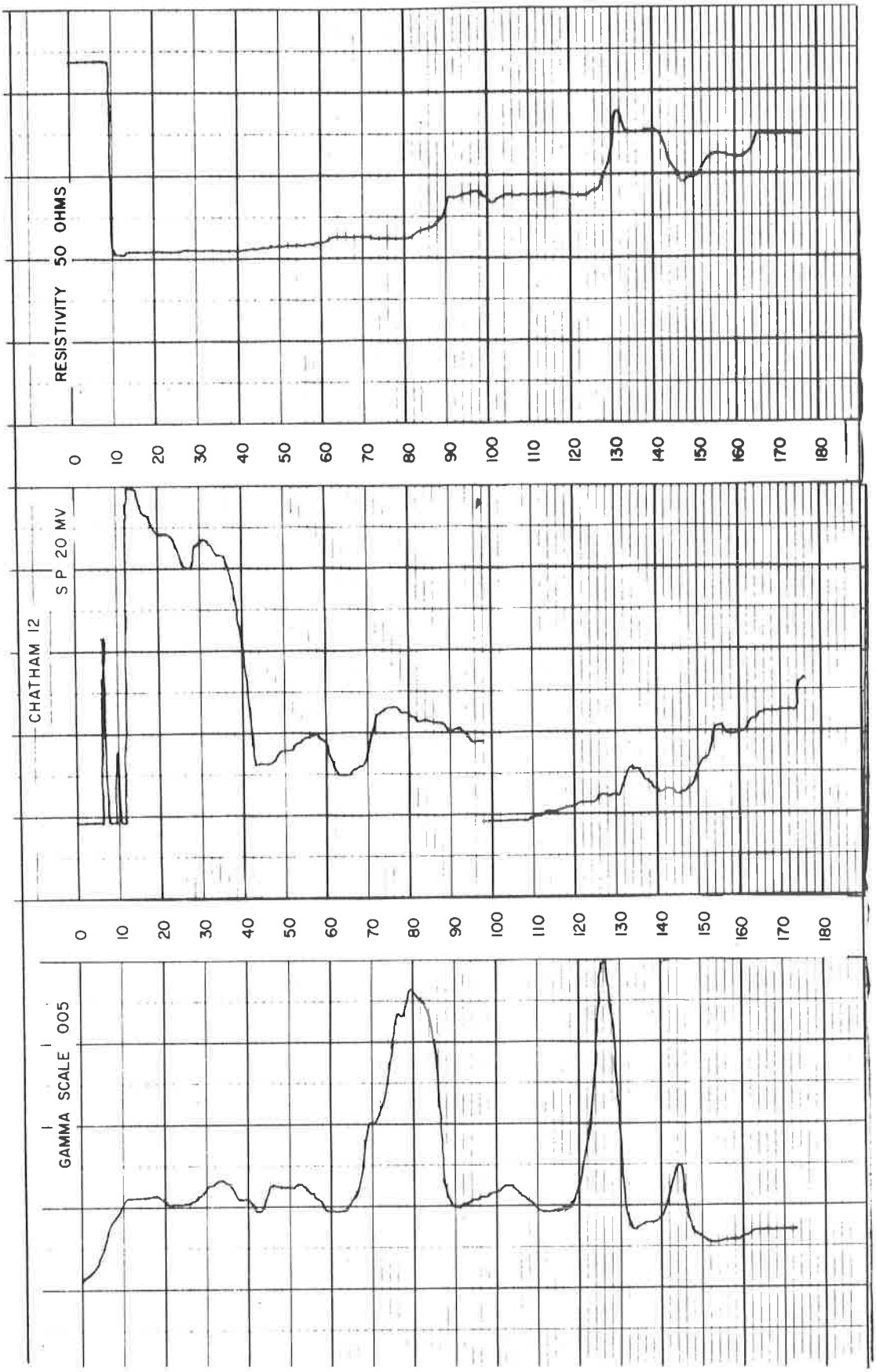


Figure CH-2. Electric and Gamma-Ray Logs - Chatham County
Hole Ch-12

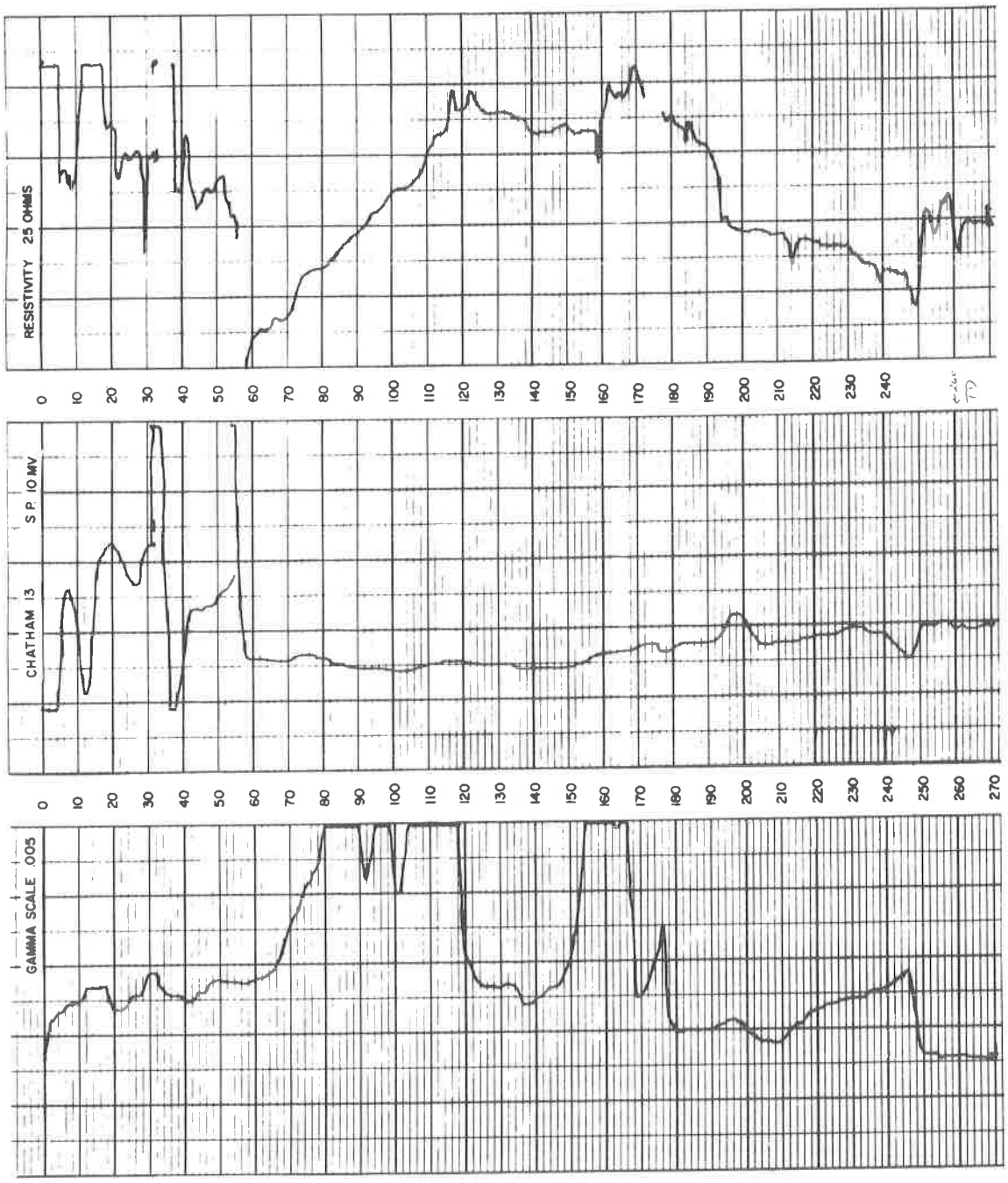


Figure CH-2. Electric and Gamma-Ray Logs - Chatham County Hole Ch-13

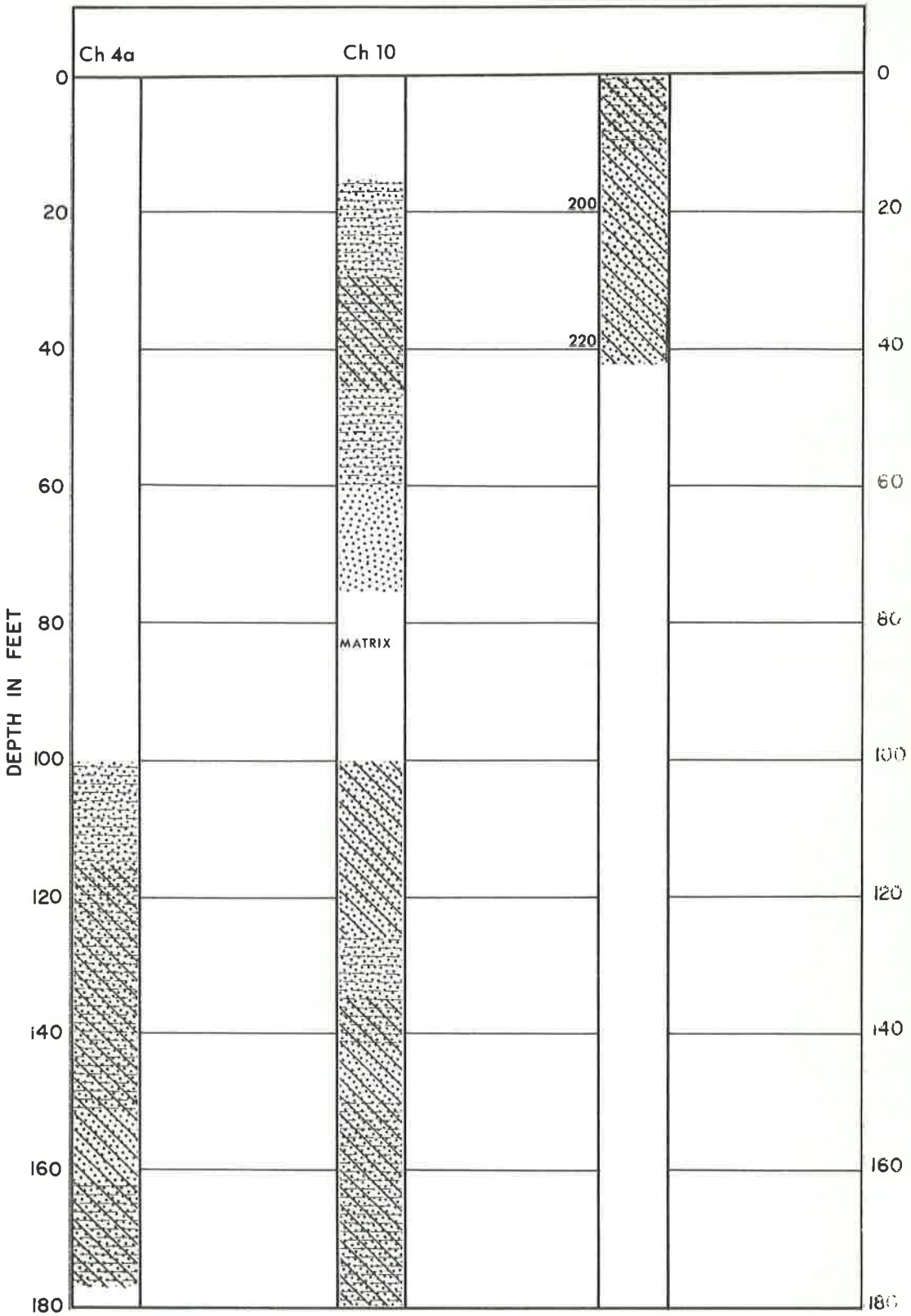


Figure Ch-3. Lithologic Logs - Chatham County

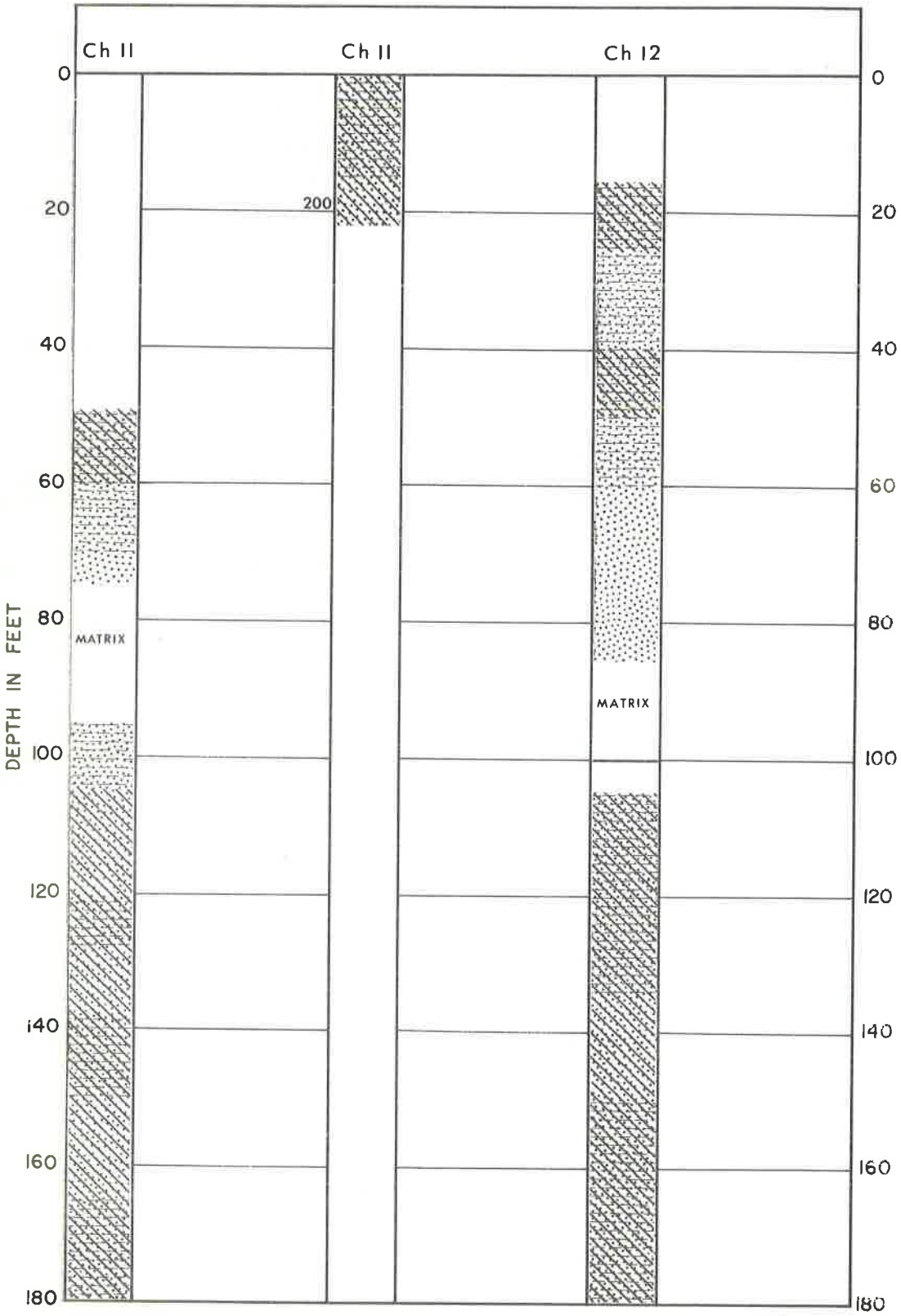


Figure Ch-3. Lithologic Logs - Chatham County (Cont.)

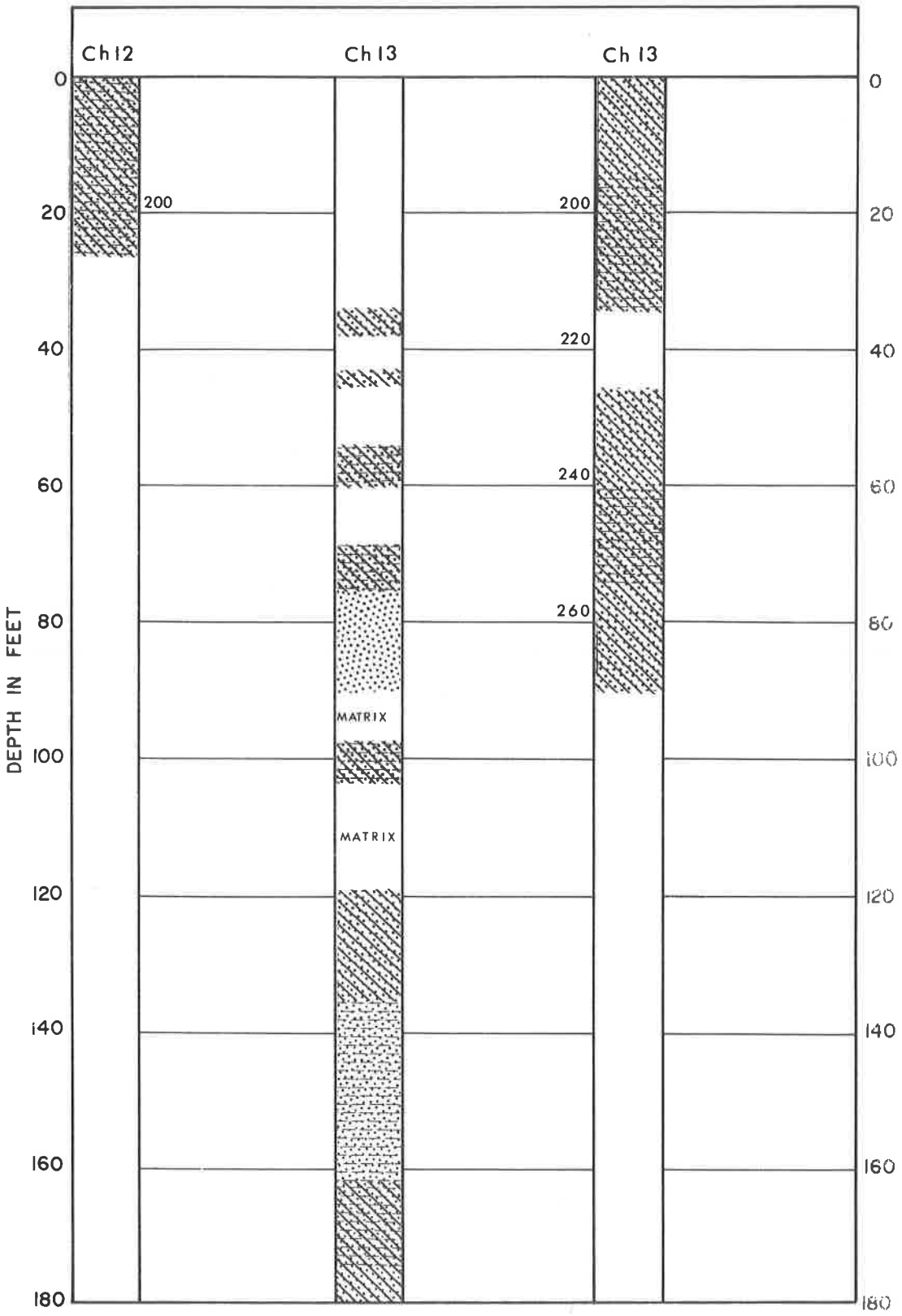


Figure Ch-3. Lithologic Logs - Chatham County (Cont.)

TABLE CH-I

BPL DETERMINATION ON CORES

Chatham County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Ch-4A	5	0-5	Wash Sample	-	0
		5-10	Wash Sample	-	0
		10-15	Wash Sample	-	0
		15-20	Wash Sample	-	0
		20-25	Wash Sample	-	0
		25-30	Wash Sample	-	0
		30-35	Wash Sample	-	0
		35-40	Wash Sample	-	0
		40-45	Wash Sample	-	0
		45-50	Wash Sample	-	0
		50-55	Wash Sample	-	0
		55-60	Wash Sample	-	0
		60-65	Wash Sample	-	0
		65-70	Wash Sample	-	0
		70-75	Wash Sample	-	0
		75-80	Wash Sample	-	2.36
		80-85	Wash Sample	-	20.90
		85-90	Wash Sample	-	27.15
		90-95	Wash Sample	-	11.47
		95-100	Wash Sample	-	10.29
		100-115	11	73	4.05
		115-125	2	20	1.69
		125-150	1	4	1.18
		150-161	6	54	0
		161-176	10	67	0
Ch-10	7	0-15	-	-	-
		15-30	1	7	0
		30-45	1	7	0
		45-59	13	93	0
		59-60	1	100	0
		60-75	4	34	3.46
		75-89	14	100	32.30
		89-100	11	100	13.15
		100-120	-	-	-
		120-125	3	60	2.19
		125-135	2	20	2.53
		135-142	3	43	0.67
		142-150	3	38	1.69

(Continued)

TABLE CH-I (Continued)

BPL DETERMINATION ON CORES

Chatham County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Ch-10		150-165	3	20	0.84
		165-180	-	-	-
		180-191	6	55	1.32
		191-195	4	100	0
		195-207	4	33	0
		207-222	5	33	0
Ch-11	5	0-5	Wash Sample	-	0.34
		5-10	Wash Sample	-	0
		10-15	Wash Sample	-	0
		15-20	Wash Sample	-	0
		20-25	Wash Sample	-	0
		25-30	Wash Sample	-	0
		30-35	Wash Sample	-	0
		35-40	Wash Sample	-	0
		40-45	Wash Sample	-	0
		45-50	Wash Sample	-	0
		50-60	2	20	0
		60-70	6	60	0
		70-75	2	40	0
		75-85	10	100	23.10
		85-95	10	100	30.35
		95-105	7	70	1.69
		105-115	2	20	3.71
		115-121	6	100	3.54
		121-128	7	100	7.25
		128-138	1	10	1.10
		138-150	2	17	1.01
		150-165	3	20	0.67
		165-180	10	67	0
		180-195	14	93	0
		195-202	7	100	0
Ch-12	5	0-5	Wash Sample	-	0
		5-10	Wash Sample	-	0
		10-15	-	-	-
		15-25	8	80	0

(Continued)

TABLE CH-I (Continued)

BPL DETERMINATION ON CORES

Chatham County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Ch-12		25-40	8	53	0
		40-50	10	100	0
		50-60	6	60	0
		60-70	1	10	0
		70-85	6	40	9.78
		85-100	3	20	28.33
		100-105	-	-	-
		105-120	4	27	3.03
		120-135	3	20	2.70
		135-150	9	60	0
		150-165	3	20	0
		165-180	7	47	0
		180-195	5	33	0
		195-203	3	38	0
		203-206	2	67	0
Ch-13	5	0-34	-	-	-
		34-38	4	100	0
		38-43	-	-	-
		43-45	2	100	0
		45-54	-	-	-
		54-60	6	100	0
		60-68	-	-	-
		68-75	7	100	0
		75-90	11	73	5.90
		90-105	14	93	10.45
		105-119	14	100	30.35
		119-120	-	-	-
		120-135	2	13	5.73
		135-146	11	100	2.87
		146-150	4	100	2.19
		150-162	12	100	2.02
		162-165	3	100	2.70
		165-175	10	100	3.03
		175-180	1	20	1.01
		180-195	2	13	1.35
		195-210	1	7	0.51
		210-214	3	75	0.67
		214-225	-	-	-

(Continued)

TABLE CH-I (Continued)

BPL DETERMINATION ON CORES

Chatham County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery		BPL %
			Feet	%	
Ch-13		225-240	7	47	0.67
		240-255	7	47	0.34
		255-270	10	67	0.34

TABLE CH-II

MATRIX BENEFICIATION RESULTS

CHATHAM COUNTY

HOLE NO. CH-10 MATRIX INTERVAL = 75-100

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	25										
DRY DENSITY LB/CU FT	85.47										
PERCENT DRY WEIGHT	100.0	2.88	.67	2.15	71.95	5.75	66.19	22.35	27.40	57.24	15.36
PERCENT BPL	23.10	17.03	33.38	30.18	25.53	21.41	27.65	15.07	65.92	3.37	28.43
PERCENT ACID INSOL	61.01	22.91	34.63	51.55	62.47	68.82	59.73	62.92	2.41	94.69	60.40
PERCENT IRON OXIDE	.66	.31	.74	.49	.30	.26	.27	1.88	.41	.11	.74
PERCENT ALUM OXIDE	2.41	4.34	2.69	2.08	1.68	1.29	1.47	4.53	.45	1.46	2.04
PERCENT CALC OXIDE	17.49	30.43	30.08	12.94	19.59	15.79	20.99	9.12	44.77	3.29	36.88

TABLE CH-II (CONT.)

MATRIX BENEFICIATION RESULTS

CHATHAM COUNTY

HOLE NO. CH-11 MATRIX INTERVAL = 75-95

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	20										
DRY DENSITY LB/CU FT	76.92										
PERCENT DRY WEIGHT	100.0	.22	.60	1.48	68.62	6.38	62.24	29.08	47.06	40.48	12.46
PERCENT BPL	26.64	46.03	46.87	44.51	34.23	23.44	36.25	7.26	66.26	3.87	10.75
PERCENT ACID INSOL	49.30	27.01	29.56	34.22	49.67	66.53	47.17	49.77	2.76	94.02	74.88
PERCENT IRON OXIDE	.69	.71	.66	.59	.31	.19	.31	1.59	.41	.08	.48
PERCENT ALUM OXIDE	2.54	1.23	2.12	1.64	1.59	1.35	1.81	5.19	.70	1.82	.32
PERCENT CALC OXIDE	23.09	35.68	33.93	34.28	26.58	17.49	26.58	13.97	48.97	3.22	14.53

TABLE CH-II (CONT.)

MATRIX BENEFICIATION RESULTS

CHATHAM COUNTY

HOLE NO. CH-12 MATRIX INTERVAL = 82-100

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	18										
DRY DENSITY LB/CU FT	90.56										
PERCENT DRY WEIGHT	100.0	14.79	1.24	3.16	61.00	6.95	54.05	19.81	33.10	37.65	29.25
PERCENT BPL	32.04	3.54	48.56	47.89	34.73	27.99	33.89	41.47	66.43	9.80	26.80
PERCENT ACID INSOL	48.22	42.51	26.27	28.21	48.89	59.62	50.87	54.99	3.15	85.55	59.79
PERCENT IRON OXIDE	.68	.49	.86	.83	.56	.27	.34	1.77	.53	.17	.17
PERCENT ALUM OXIDE	2.57	1.94	1.62	1.37	1.64	1.23	1.66	6.16	.70	1.79	2.22
PERCENT CALC OXIDE	23.44	19.59	33.93	32.88	22.74	19.59	23.79	26.31	48.27	7.84	24.79

NOTE: A LARGE AMOUNT OF GREENISH-YELLOW CLAY FLOATED WITH THE PHOSPHORITE IN THE ROUGH FLOTATION (FATTY ACID STEP). THE ROUGH CONCENTRATE WAS WASHED THROUGH A 200 MESH SIEVE BEFORE DE-REGENTIZATION TO AVOID FLOCCULATION OF CLAYS AND CONSEQUENT CARRY-OVER INTO THE AMINE FLOAT.

TABLE CH-II (CONT.)

MATRIX BENEFICIATION RESULTS

CHATHAM COUNTY

HOLE NO. CH-13 MATRIX INTERVAL = 90-97

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	7										
DRY DENSITY LB/CU FT	82.52										
PERCENT DRY WEIGHT	100.0	.17	.83	7.11	73.35	8.95	64.40	18.53	15.27	75.46	9.27
PERCENT BPL	9.44	17.37	13.66	6.24	10.96	9.78	12.81	4.39	67.51	1.01	3.27
PERCENT ACID INSOL	81.65	73.92	80.29	91.55	81.23	66.21	82.14	79.65	2.09	98.54	74.87
PERCENT IRON OXIDE	1.02	.83	.45	.19	.37	.19	.40	3.94	.81	.11	.88
PERCENT ALUM OXIDE	2.76	1.58	2.51	1.34	1.28	.92	1.19	9.19	.61	1.06	2.73
PERCENT CALC OXIDE	6.65	11.54	9.09	3.50	8.09	5.95	8.40	2.00	46.87	.70	3.68

TABLE CH-II (CONT.)

MATRIX BENEFICIATION RESULTS

CHATHAM COUNTY

HOLE NO. CH-13 MATRIX INTERVAL = 103-119

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	16										
DRY DENSITY LB/CU FT	59.39										
PERCENT DRY WEIGHT	100.0	.06	.39	2.15	62.12	8.83	53.29	35.28	48.77	33.89	17.34
PERCENT BPL	31.36	62.89	61.21	49.91	38.27	26.81	41.82	17.68	65.92	2.19	34.78
PERCENT ACID INSOL	47.90	5.75	9.33	26.44	44.43	61.78	38.52	55.82	2.41	96.38	52.28
PERCENT IRON OXIDE	1.15	.30	.66	.55	.41	.26	.42	2.50	.41	.08	.36
PERCENT ALUM OXIDE	4.11	.62	1.62	1.56	1.71	1.45	1.61	8.52	.45	1.80	3.63
PERCENT CALC OXIDE	20.64	46.17	42.67	31.58	24.84	17.49	29.36	12.29	44.77	1.96	43.61

NOTE: CLAY CHIPS PRESENT IN FLOTATION FEED MADE ROUGHER FLOTATION VERY DIFFICULT. THE FLOTATION FEED HAD TO BE SCRUBBED, AND WASHED THROUGH A 200 MESH SCREEN PRIOR TO FLOTATION. FLOTATION WAS SUCCESSFUL AFTER THIS CLEANING TREATMENT.

TABLE CH-III.

ECONOMIC FACTORS - FIGURES OF MERIT

		INDIVIDUAL MATRICES	WELL NO. H-10
MATRIX NO.		1	
DEPTH INTERVAL, FT.		75-100	
ECONOMIC FACTORS *	UNIT (M=1000)		
* OVERBURDEN	FT.	75.00	
	MT/AC	147.0	
* MATRIX	FT.	25.00	
	MT/AC	46.5	
* BPL IN MATRIX	PERCENT	23.10	
	MT/AC	10.7	
* OVERBURDEN/MATRIX	RATIO	3.00	
WASH-SCREEN PRODUCTS			
+16 MESH	MT/AC	2.7	
-16+150 MESH	MT/AC	33.5	
-150 MESH (LOSS)	MT/AC	10.4	
* FLOTATION CONCENTRATE PRODUCT	MT/AC	9.2	
TOTAL USEFUL PRODUCTS**	MT/AC	11.8	
BPL RECOVERY			
+16 MESH	MT/AC	.6	
* -16+150 (FLOT. CONC.)	PERCENT BPL	65.9	
* -16+150 (FLOT. CONC.)	MT/AC	6.0	
* TOTAL	MT/AC	6.7	
* RECOVERED FROM MATRIX	PERCENT	62.16	
* OVERBURDEN / PRODUCT	CU YD/T	10.8	
* MATRIX / PRODUCTS	CU YD/T	3.41	
* I+A IN FLOT. CONC.	PERCENT	.86	

FIGURES OF MERIT	UNIT	ECON. LEVEL	
OVERBURDEN	FT	88 MAX	1.17
MATRIX	FT	3 MIN	8.33
MATRIX BPL	PERCENT	10 MIN	2.31
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	1.00
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.27
OVERBURDEN/MATRIX	RATIO	2 MAX	.67
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	1.62
I+A IN FLOT. CONC.	PERCENT	5 MAX	5.81
PRODUCTS RECOVERY	T/AC-FT	400 MIN	1.18
BPL (+150) RECOVERY	PERCENT	63 MIN	.99
MATRIX/PRODUCTS	CU YD/T	6 MAX	1.76

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

TABLE CH-III (CONT.)

ECONOMIC FACTORS - FIGURES OF MERIT

INDIVIDUAL MATRICES WELL NO. CH-11

MATRIX NO.		1
DEPTH INTERVAL, FT.		75- 95
ECONOMIC FACTORS *	UNIT (M=1000)	
* OVERBURDEN	FT.	75.00
	MT/AC	147.0
* MATRIX	FT.	20.00
	MT/AC	33.5
* BPL IN MATRIX	PERCENT	26.64
	MT/AC	8.9
* OVERBURDEN/MATRIX	RATIO	3.75
WASH-SCREEN PRODUCTS		
+16 MESH	MT/AC	.8
-16+150 MESH	MT/AC	23.0
-150 MESH (LOSS)	MT/AC	9.7
* FLOTATION CONCENTRATE PRODUCT	MT/AC	10.8
TOTAL USEFUL PRODUCTS**	MT/AC	11.6
BPL RECOVERY		
+16 MESH	MT/AC	.3
* -16+150 (FLOT. CONC.)	PERCENT BPL	66.3
* -16+150 (FLOT. CONC.)	MT/AC	7.2
* TOTAL	MT/AC	7.5
* RECOVERED FROM MATRIX	PERCENT	84.23
* OVERBURDEN / PRODUCT	CU YD/T	12.2
* MATRIX / PRODUCTS	CU YD/T	2.78
* I+A IN FLOT. CONC.	PERCENT	1.11

FIGURES OF MERIT	UNIT	ECON. LEVEL	
OVERBURDEN	FT	88 MAX	1.17
MATRIX	FT	3 MIN	6.67
MATRIX BPL	PERCENT	10 MIN	2.66
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	1.00
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.27
OVERBURDEN/MATRIX	RATIO	2 MAX	.53
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	1.43
I+A IN FLOT. CONC.	PERCENT	5 MAX	4.50
PRODUCTS RECOVERY	T/AC-FT	400 MIN	1.45
BPL (+150) RECOVERY	PERCENT	63 MIN	1.34
MATRIX/PRODUCTS	CU YD/T	6 MAX	2.16

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

TABLE CH-III (CONT.)

ECONOMIC FACTORS - FIGURES OF MERIT

INDIVIDUAL MATRICES — WELL NO. CH-12

MATRIX NO.		1
DEPTH INTERVAL, FT.		82-100
ECONOMIC FACTORS *	UNIT (M=1000)	
* OVERBURDEN	FT.	82.00
	MT/AC	160.7
* MATRIX	FT.	18.00
	MT/AC	35.5
* BPL IN MATRIX	PERCENT	32.04
	MT/AC	11.4
* OVERBURDEN/MATRIX	RATIO	4.56
WASH-SCREEN PRODUCTS		
+16 MESH	MT/AC	6.8
-16+150 MESH	MT/AC	21.7
-150 MESH (LOSS)	MT/AC	7.0
* FLOTATION CONCENTRATE PRODUCT	MT/AC	7.2
TOTAL USEFUL PRODUCTS**	MT/AC	14.0
BPL RECOVERY		
+16 MESH	MT/AC	.9
* -16+150 (FLOT. CONC.)	PERCENT BPL	66.4
* -16+150 (FLOT. CONC.)	MT/AC	4.8
* TOTAL	MT/AC	5.7
* RECOVERED FROM MATRIX	PERCENT	50.10
* OVERBURDEN / PRODUCT	CU YD/T	9.4
* MATRIX / PRODUCTS	CU YD/T	2.08
* I+A IN FLOT. CONC.	PERCENT	1.23

FIGURES OF MERIT	UNIT	ECON. LEVEL	
OVERBURDEN	FT	88 MAX	1.07
MATRIX	FT	3 MIN	6.00
MATRIX BPL	PERCENT	10 MIN	3.20
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	1.01
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.28
OVERBURDEN/MATRIX	RATIO	2 MAX	.44
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	1.86
I+A IN FLOT. CONC.	PERCENT	5 MAX	4.07
PRODUCTS RECOVERY	T/AC-FT	400 MIN	1.94
BPL (+150) RECOVERY	PERCENT	63 MIN	.80
MATRIX/PRODUCTS	CU YD/T	6 MAX	2.89

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

TABLE CH-III (CONT.)

ECONOMIC FACTORS - FIGURES OF MERIT

INDIVIDUAL MATRICES — WELL NO. CH-13

MATRIX NO.		1	2
DEPTH INTERVAL, FT.		90- 97	103-119
ECONOMIC FACTORS *	UNIT (M=1000)		
* OVERBURDEN	FT.	90.00	6.00
	MT/AC	176.4	11.8
* MATRIX	FT.	7.00	16.00
	MT/AC	12.6	20.7
* BPL IN MATRIX	PERCENT	9.44	31.36
	MT/AC	1.2	6.5
* OVERBURDEN/MATRIX	RATIO	12.86	.38
WASH-SCREEN PRODUCTS			
+16 MESH	MT/AC	1.0	.5
-16+150 MESH	MT/AC	9.2	12.9
-150 MESH (LOSS)	MT/AC	2.3	7.3
* FLOTATION CONCENTRATE PRODUCT	MT/AC	1.4	6.3
TOTAL USEFUL PRODUCTS**	MT/AC	2.4	6.8
BPL RECOVERY			
+16 MESH	MT/AC	.1	.3
* -16+150 (FLOT. CONC.)	PERCENT BPL	67.5	65.9
* -16+150 (FLOT. CONC.)	MT/AC	1.0	4.1
* TOTAL	MT/AC	1.0	4.4
* RECOVERED FROM MATRIX	PERCENT	86.33	67.99
* OVERBURDEN / PRODUCT	CU YD/T	65.2	2.2
* MATRIX / PRODUCTS	CU YD/T	4.65	3.79
* I+A IN FLOT. CONC.	PERCENT	1.42	.86

FIGURES OF MERIT	UNIT	ECON. LEVEL		
OVERBURDEN	FT	88 MAX	.98	14.67
MATRIX	FT	3 MIN	2.33	5.33
MATRIX BPL	PERCENT	10 MIN	.94	3.14
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	1.02	1.00
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.30	1.27
OVERBURDEN/MATRIX	RATIO	2 MAX	.16	5.33
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	.27	8.12
I+A IN FLOT. CONC.	PERCENT	5 MAX	3.52	5.81
PRODUCTS RECOVERY	T/AC-FT	400 MIN	.87	1.06
BPL (+150) RECOVERY	PERCENT	63 MIN	1.37	1.08
MATRIX/PRODUCTS	CU YD/T	6 MAX	1.29	1.58

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

TABLE CH-III (CONT.)

ECONOMIC FACTORS - FIGURES OF MERIT

		COMBINED MATRICES	WELL NO. CH-13					
		MATRICES	MATRICES	MATRICES	MATRICES	MATRICES	MATRICES	MATRICES
ECONOMIC FACTORS *	UNIT (M=1000)							
* OVERBURDEN	FT.	90.00	96.00					
	MT/AC	176.4	188.2					
* MATRIX	FT.	7.00	23.00					
	MT/AC	12.6	33.3					
* BPL IN MATRIX	PERCENT	9.44	23.07					
	MT/AC	1.2	7.7					
* OVERBURDEN/MATRIX	RATIO	12.86	4.17					
WASH-SCREEN PRODUCTS								
+16 MESH	MT/AC	1.0	1.6					
-16+150 MESH	MT/AC	9.2	22.1					
-150 MESH (LOSS)	MT/AC	2.3	9.6					
* FLOTATION CONCENTRATE PRODUCT	MT/AC	1.4	6.3					
TOTAL USEFUL PRODUCTS**	MT/AC	2.4	9.2					
BPL RECOVERY								
+16 MESH	MT/AC	.1	.4					
* -16+150 (FLOT. CONC.)	PERCENT BPL	********	********					
* -16+150 (FLOT. CONC.)	MT/AC	1.0	5.1					
* TOTAL	MT/AC	1.0	5.4					
* RECOVERED FROM MATRIX	PERCENT	86.33	70.82					
* OVERBURDEN / PRODUCT	CU YD/T	65.2	22.7					
* MATRIX / PRODUCTS	CU YD/T	4.65	4.02					
* I+A IN FLOT. CONC.	PERCENT	1.42	1.03					

FIGURES OF MERIT	UNIT	ECON. LEVEL		
OVERBURDEN	FT	88 MAX	.98	.92
MATRIX	FT	3 MIN	2.33	7.67
MATRIX BPL	PERCENT	10 MIN	.94	2.31
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	1.02	1.00
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.30	1.27
OVERBURDEN/MATRIX	RATIO	2 MAX	.16	.48
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	8.43	3.77
I+A IN FLOT. CONC.	PERCENT	5 MAX	3.52	4.85
PRODUCTS RECOVERY	T/AC-FT	400 MIN	.87	1.00
BPL (+150) RECOVERY	PERCENT	63 MIN	1.37	1.12
MATRIX/PRODUCTS	CU YD/T	6 MAX	1.29	1.49

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

CLINCH COUNTY

CLINCH COUNTY

SUMMARY OF RESULTS

Two new holes in Southeast Clinch County, numbers 4 and 5, are reported herein.

Cl-4 had four matrix areas that were beneficiated. At best the matrices may be considered marginal to sub-marginal for economic exploitation.

Cl-5 had one matrix which was relatively deep and thin. It is sub-marginal.

Electric logs were not run at Cl-4 because of cave-in of the hole walls. The gamma-ray log was run inside the drill pipe.

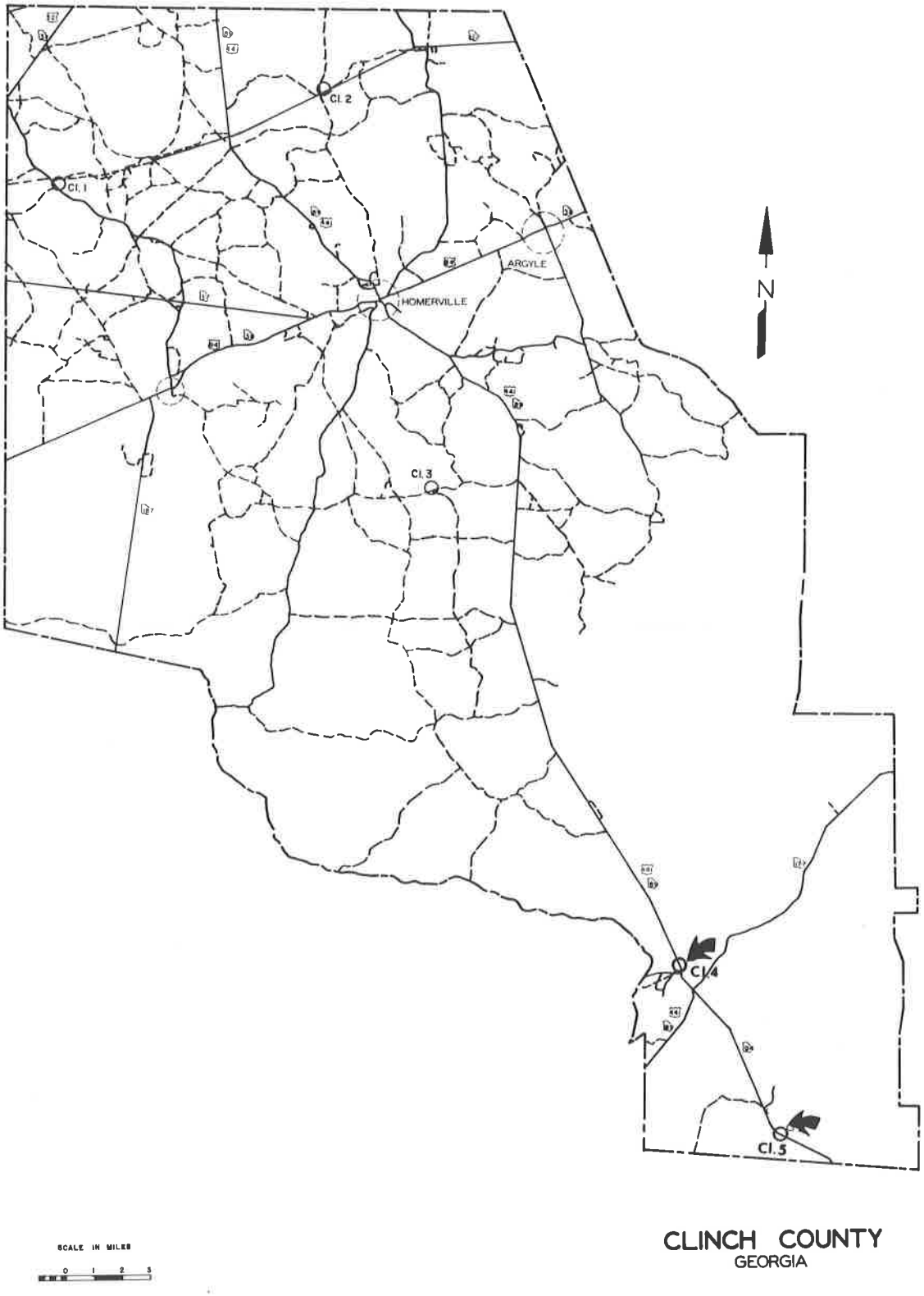


Figure CL-1. Location of Holes - Clinch County

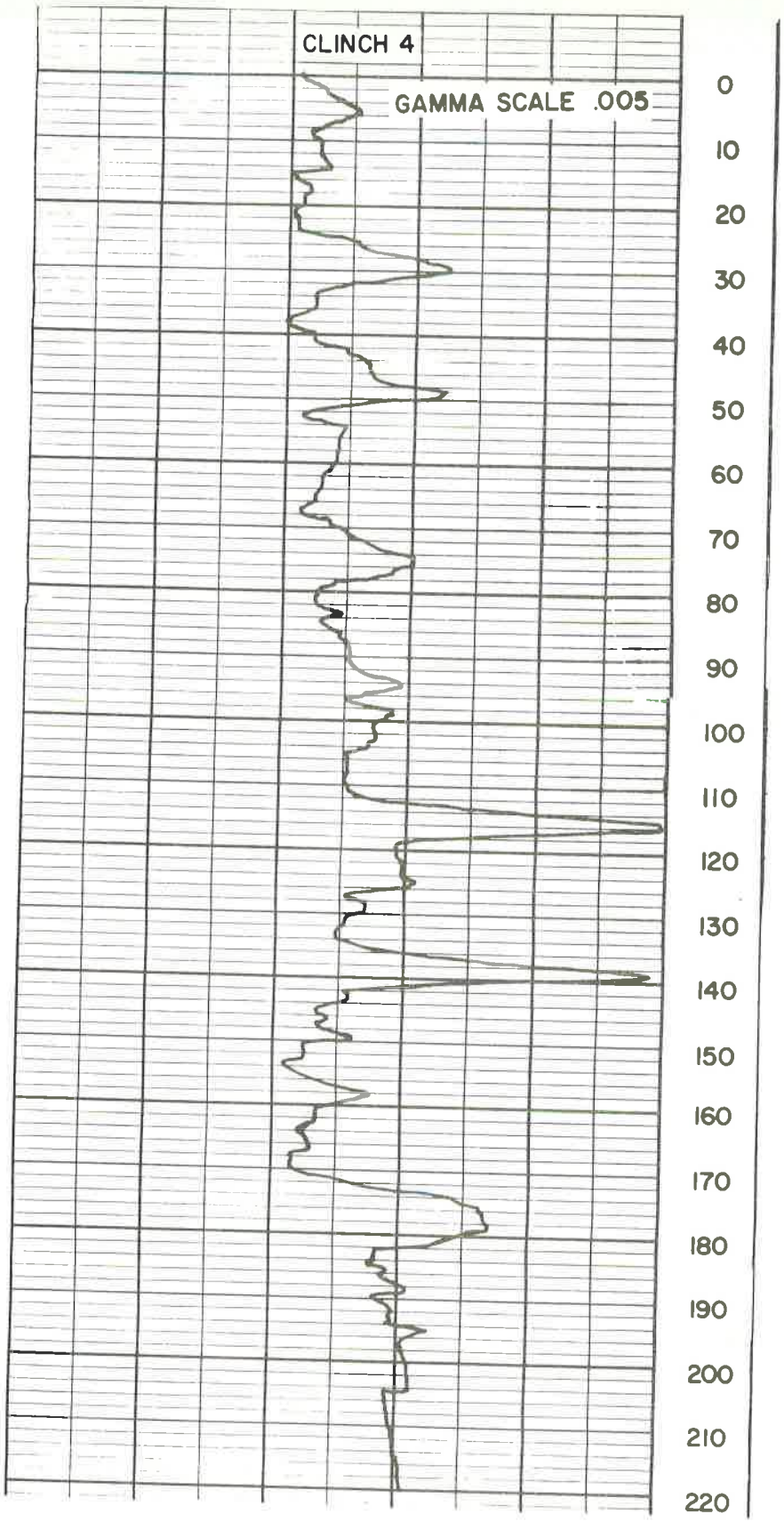


Figure CL-2. Gamma-Ray Logs - Clinch County Hole Cl-4

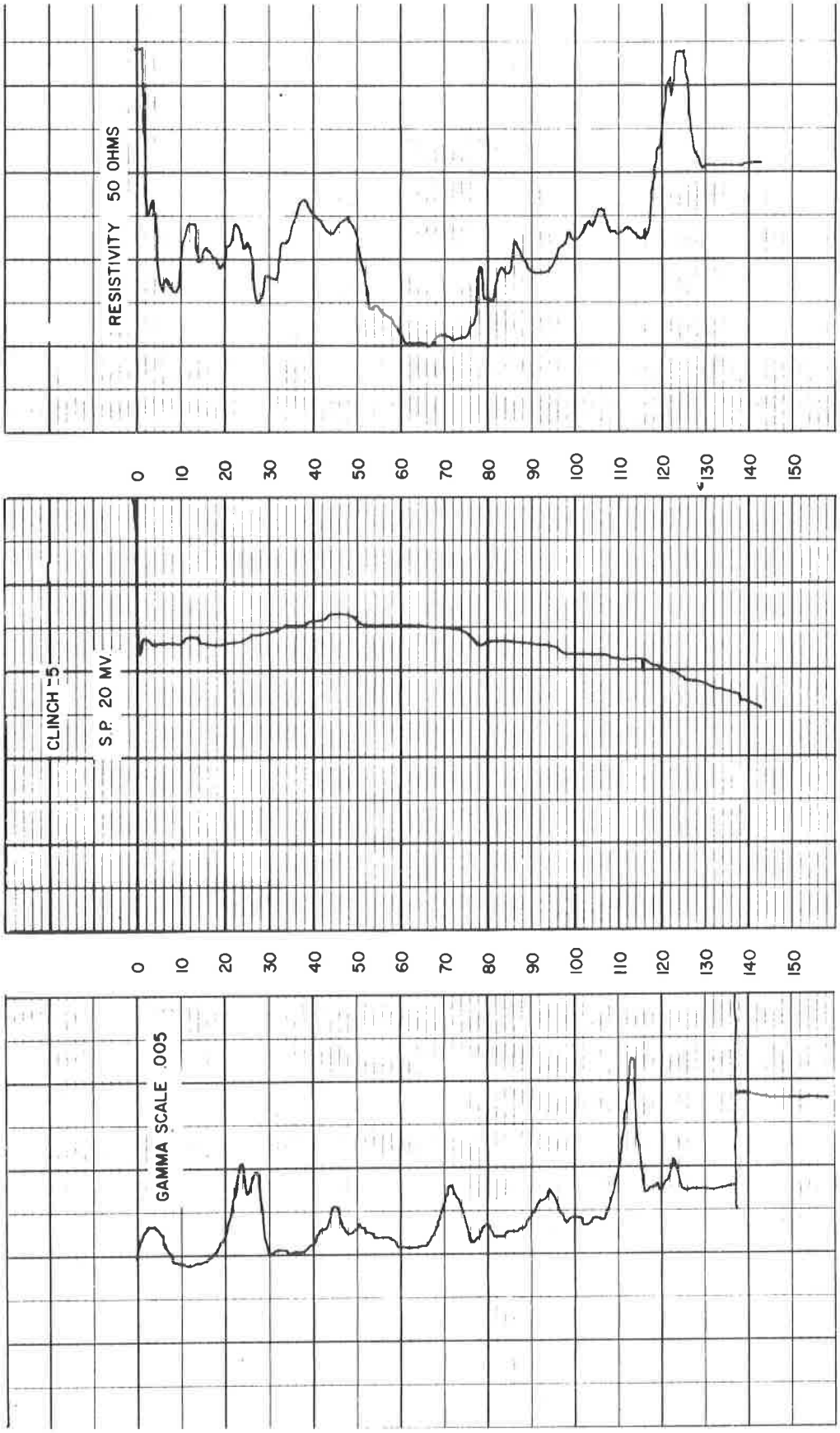


Figure CL-2. Electric and Gamma-Ray Logs - Clinch County
Hole Cl-5

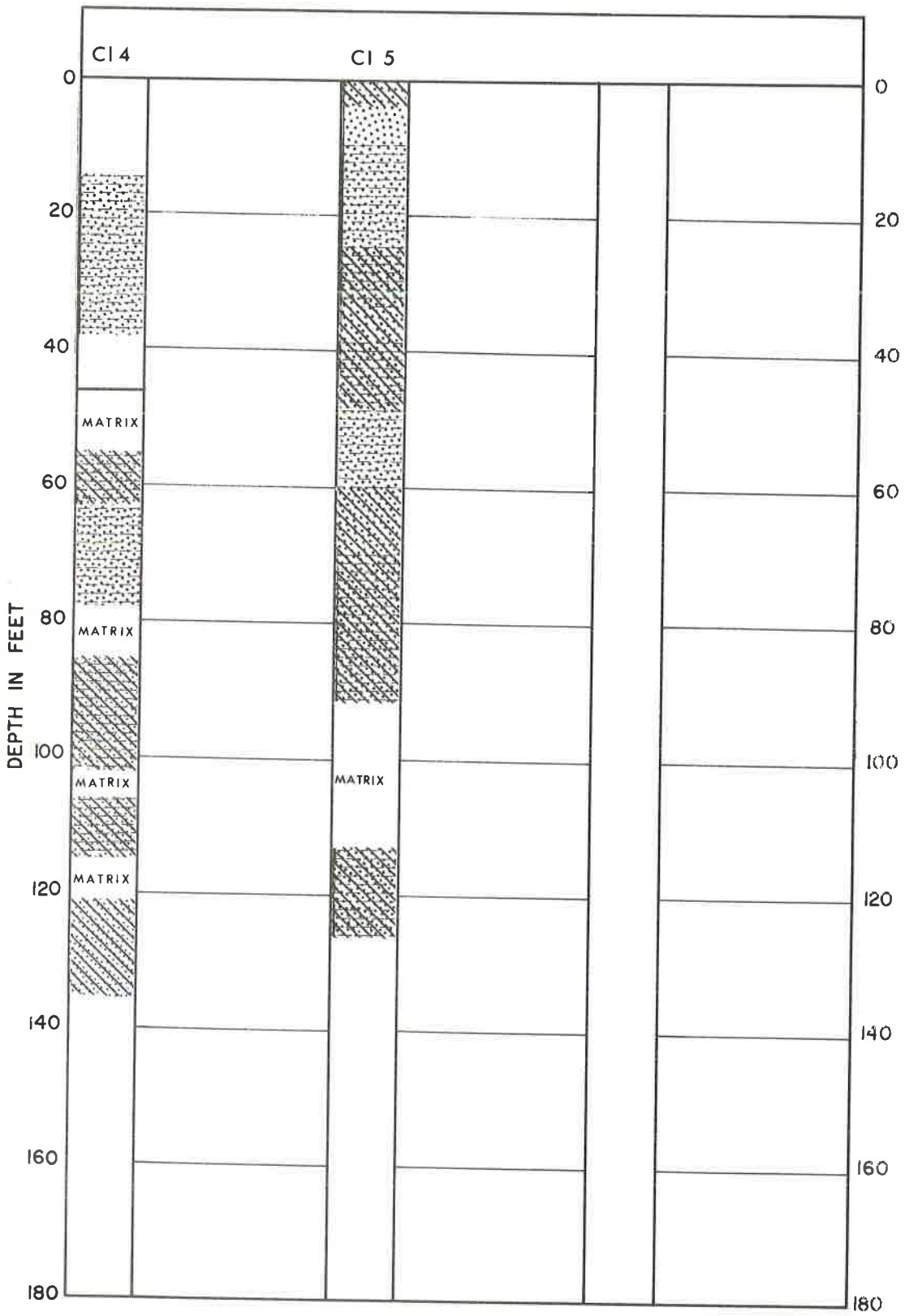


Figure Cl-3. Lithologic Logs - Clinch County

TABLE CL-I

BPL DETERMINATION ON CORES

Clinch County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Cl-4	119	0-8	8	100	0
		8-11	3	100	0
		11-18	5	71	0
		18-23	5	100	0
		23-27	4	100	0
		27-30	1	33	0
		30-38	4	50	6.71
		38-46	-	-	-
		46-55	3	33	9.04
		55-63	8	100	3.81
		63-71	8	100	2.22
		71-78	7	100	2.22
		78-85	7	100	13.08
		85-92	7	100	6.15
		92-102	10	100	5.19
		102-106	3	75	10.15
		106-115	6	67	7.72
		115-121	6	100	10.59
		121-126	3	60	2.73
		126-135	1	11	6.98
		135-140	Wash Sample	-	8.56
		140-145	Wash Sample	-	6.20
		145-150	Wash Sample	-	11.30
		150-155	Wash Sample	-	6.00
		155-160	Wash Sample	-	4.48
		160-165	Wash Sample	-	4.15
		165-170	Wash Sample	-	6.00
		170-175	Wash Sample	-	5.40
		175-180	Wash Sample	-	3.24
		180-185	Wash Sample	-	2.63
		185-190	Wash Sample	-	3.91
		190-195	Wash Sample	-	3.78
		195-200	Wash Sample	-	3.44
		200-205	Wash Sample	-	3.68
		205-210	Wash Sample	-	4.08
		210-215	Wash Sample	-	6.14
		215-220	Wash Sample	-	8.33
		220-225	Wash Sample	-	4.45
Cl-5	121	0-3	2	67	0
		3-6	3	100	0
		6-9	3	100	0

(Continued)

TABLE CL-I (Continued)

BPL DETERMINATION ON CORES

Clinch County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Cl-5	121	9-13	2	50	0.34
		13-18	4	80	0
		18-25	7	100	0.44
		25-33	4	50	1.79
		33-38	5	100	1.58
		38-48	9	90	1.01
		48-60	11	92	5.90
		60-68	2	25	5.83
		68-78	7	70	10.55
		78-91	13	100	7.22
		91-98	5	71	14.36
		98-113	5	33	17.54
		113-126	8	62	8.23
		126-130	Wash Sample	-	12.71
		130-135	Wash Sample	-	13.59
		135-140	Wash Sample	-	14.26
		140-145	Wash Sample	-	13.46
		145-150	Wash Sample	-	7.01
		150-155	Wash Sample	-	8.50
		155-160	Wash Sample	-	3.88

TABLE CL-II

MATRIX BENEFICIATION RESULTS

CLINCH COUNTY

HOLE NO. CL-04 MATRIX INTERVAL = 46-55

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	9										
DRY DENSITY LB/CU FT	92.24										
PERCENT DRY WEIGHT	100.0	.00	.11	1.08	74.08	4.13	69.95	24.72	10.18	69.78	20.03
PERCENT BPL	9.31	.00	36.08	23.44	9.78	11.80	8.09	7.17	53.62	4.89	1.18
PERCENT ACID INSOL	83.29	.00	42.30	53.87	85.87	76.19	90.74	77.04	22.28	92.26	97.91
PERCENT IRON OXIDE	1.02	.00	2.86	1.93	.64	1.01	.46	2.11	2.57	.34	.40
PERCENT ALUM OXIDE	4.13	.00	3.59	2.47	2.88	1.71	2.34	7.95	2.00	2.61	1.91
PERCENT CALC OXIDE	5.25	.00	20.99	14.34	4.55	9.09	4.20	6.88	34.98	2.10	.91

TABLE CL-II (CONT.)

MATRIX BENEFICIATION RESULTS

CLINCH COUNTY

HOLE NO. CL-04 MATRIX INTERVAL = 78-85

	FEED 7	+4	4X8	8X16	F T 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE											
DRY DENSITY LB/CU FT	93.31										
PERCENT DRY WEIGHT	100.0	3.42	3.29	4.58	47.37	9.24	38.14	41.34	20.55	74.06	5.39
PERCENT LPL	11.16	8.60	8.60	15.34	14.84	26.30	12.14	6.89	56.82	6.07	5.06
PERCENT ACID INSOL	49.35	10.12	17.50	19.08	70.66	41.52	76.39	34.06	5.91	88.03	89.57
PERCENT IRON OXIDE	1.43	.69	1.08	1.50	.92	1.72	.81	2.10	2.36	.53	1.43
PERCENT ALUM OXIDE	3.73	1.89	2.37	2.37	3.09	1.70	3.25	4.87	1.39	3.08	7.56
PERCENT CALC OXIDE	15.39	28.33	26.24	26.24	12.59	13.64	10.14	15.46	33.93	4.20	4.20

TABLE CL-II (CONT.)

MATRIX BENEFICIATION RESULTS

CLINCH COUNTY

HOLE NO. CL-04 MATRIX INTERVAL = 102-106

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	4										
DRY DENSITY LB/CU FT	176.73										
PERCENT DRY WEIGHT	100.0	1.32	1.53	2.21	81.52	4.35	77.17	13.42	9.87	83.20	6.93
PERCENT BPL	9.58	3.54	5.23	10.12	8.09	11.80	8.09	19.63	62.05	1.85	9.44
PERCENT ACID INSOL	71.55	31.98	36.19	32.24	76.32	61.73	87.28	56.96	5.52	95.39	83.40
PERCENT IRON OXIDE	.44	.38	.51	.78	.28	.60	.28	1.35	1.86	.11	.57
PERCENT ALUM OXIDE	2.25	1.89	2.05	1.76	1.76	1.16	1.32	5.36	1.27	1.25	3.92
PERCENT CALC OXIDE	11.89	27.28	25.18	28.33	8.74	19.59	8.04	25.29	43.37	.59	6.72

TABLE CL-II (CONT.)

MATRIX BENEFICIATION RESULTS

CLINCH COUNTY

HOLE NO. CL-04 MATRIX INTERVAL = 115-121

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	6										
DRY DENSITY LB/CU FT	115.09										
PERCENT DRY WEIGHT	100.0	4.13	2.44	1.71	68.04	1.30	66.75	23.68	11.86	85.00	3.13
PERCENT BPL	8.97	19.39	24.28	19.56	7.08	12.98	7.92	10.24	45.52	1.52	3.03
PERCENT ACID INSOL	68.38	21.06	21.10	22.37	88.00	31.36	88.44	28.45	30.89	95.68	94.41
PERCENT IRON OXIDE	.47	1.36	1.57	1.36	.28	.77	.27	.68	1.50	.10	.26
PERCENT ALUM OXIDE	2.25	1.31	1.44	1.44	2.25	1.44	2.26	2.56	2.97	1.81	2.40
PERCENT CALC OXIDE	15.39	36.03	37.43	37.08	8.04	32.13	7.34	29.08	35.68	2.66	5.60

TABLE CL-II (CONT.)

MATRIX BENEFICIATION RESULTS

CLINCH COUNTY

HOLE NO. CL-05 MATRIX INTERVAL = 91-113

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	22										
DRY DENSITY LB/CU FT	115.04										
PERCENT DRY WEIGHT	100.0	3.06	1.50	2.19	50.00	13.96	36.04	43.25	33.23	59.13	7.64
PERCENT BPL	15.49	10.45	11.47	19.22	21.58	27.99	16.52	8.76	57.66	2.87	8.60
PERCENT ACID INSOL	44.20	20.89	17.95	15.83	63.89	49.60	72.52	25.43	23.43	80.77	83.03
PERCENT IRON OXIDE	.94	.51	.57	.87	.74	.99	.72	1.22	2.22	.14	.66
PERCENT ALUM OXIDE	2.69	1.47	1.38	1.38	1.80	1.07	1.88	3.92	1.55	1.56	3.61
PERCENT CALC OXIDE	22.74	27.63	25.18	37.43	19.24	27.63	19.24	25.61	39.18	1.05	13.99

TABLE CL-III

ECONOMIC FACTORS - FIGURES OF MERIT

INDIVIDUAL MATRICES — WELL NO. CL-04

MATRIX NO. / DEPTH INTERVAL, FT.		1 46- 55	2 78- 85	3 102-106	4 115-121
ECONOMIC FACTORS *	UNIT (M=1000)				
* OVERBURDEN	FT.	46.00	23.00	17.00	9.00
	MT/AC	90.2	45.1	33.3	17.6
* MATRIX	FT.	9.00	7.00	4.00	6.00
	MT/AC	18.1	14.2	15.4	15.0
* BPL IN MATRIX	PERCENT	9.31	11.16	9.58	8.97
	MT/AC	1.7	1.6	1.5	1.3
* OVERBURDEN/MATRIX	RATIO	5.11	3.29	4.25	1.50
WASH-SCREEN PRODUCTS					
+16 MESH	MT/AC	.2	1.6	.8	1.2
-16+150 MESH	MT/AC	13.4	6.7	12.6	10.2
-150 MESH (LOSS)	MT/AC	4.5	5.9	2.1	3.6
* FLOTATION CONCENTRATE PRODUCT	MT/AC	1.4	1.4	1.2	1.2
TOTAL USEFUL PRODUCTS**	MT/AC	1.6	3.0	2.0	2.5
BPL RECOVERY					
+16 MESH	MT/AC	.1	.2	.1	.3
* -16+150 (FLOT. CONC.)	PERCENT BPL	53.6	56.8	62.0	45.5
* -16+150 (FLOT. CONC.)	MT/AC	.7	.8	.8	.6
* TOTAL	MT/AC	.8	1.0	.8	.8
* RECOVERED FROM MATRIX	PERCENT	46.58	61.03	55.76	60.22
* OVERBURDEN / PRODUCT	CU YD/T	45.9	12.0	6.9	4.6
* MATRIX / PRODUCTS	CU YD/T	9.19	3.78	3.20	3.94
* I+A IN FLOT. CONC.	PERCENT	4.57	3.75	3.13	4.47

FIGURES OF MERIT	UNIT	ECON. LEVEL				
OVERBURDEN	FT	88 MAX	1.91	3.83	5.18	9.78
MATRIX	FT	3 MIN	3.00	2.33	1.33	2.00
MATRIX BPL	PERCENT	10 MIN	.93	1.12	.96	.90
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	.81	.86	.94	.69
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.03	1.09	1.19	.88
OVERBURDEN/MATRIX	RATIO	2 MAX	.39	.61	.47	1.33
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	.38	1.46	2.53	3.79
I+A IN FLOT. CONC.	PERCENT	5 MAX	1.09	1.33	1.60	1.12
PRODUCTS RECOVERY	T/AC-FT	400 MIN	.44	1.07	1.26	1.02
BPL (+150) RECOVERY	PERCENT	63 MIN	.74	.97	.89	.96
MATRIX/PRODUCTS	CU YD/T	6 MAX	.65	1.59	1.88	1.52

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

TABLE CL-III (CONT.)

ECONOMIC FACTORS - FIGURES OF MERIT

		COMBINED MATRICES			WELL NO. CL-04			
		MATRICES	MATRICES	MATRICES	MATRICES	MATRICES	MATRICES	MATRICES
ECONOMIC FACTORS *	UNIT (M=1000)	1-1	1-2	1-3	1-4			
* OVERBURDEN	FT.	46.00	69.00	86.00	95.00			
	MT/AC	90.2	135.2	168.6	186.2			
* MATRIX	FT.	9.00	16.00	20.00	26.00			
	MT/AC	18.1	32.3	47.7	62.7			
* BPL IN MATRIX	PERCENT	9.31	10.12	9.95	9.71			
	MT/AC	1.7	3.3	4.7	6.1			
* OVERBURDEN/MATRIX	RATIO	5.11	4.31	4.30	3.65			
WASH-SCREEN PRODUCTS								
+16 MESH	MT/AC	.2	1.8	2.6	3.8			
-16+150 MESH	MT/AC	13.4	20.1	32.7	42.9			
-150 MESH (LOSS)	MT/AC	4.5	10.3	12.4	16.0			
* FLOTATION CONCENTRATE PRODUCT	MT/AC	1.4	1.4	1.2	1.2			
TOTAL USEFUL PRODUCTS**	MT/AC	1.6	4.6	6.6	9.0			
BPL RECOVERY								
+16 MESH	MT/AC	.1	.2	.3	.5			
* -16+150 (FLOT. CONC.)	PERCENT BPL	********	********	********	*********			
* -16+150 (FLOT. CONC.)	MT/AC	.7	1.5	2.3	2.8			
* TOTAL	MT/AC	.8	1.8	2.6	3.4			
* RECOVERED FROM MATRIX	PERCENT	46.58	53.59	54.27	55.58			
* OVERBURDEN / PRODUCT	CU YD/T	45.9	23.6	17.3	13.8			
* MATRIX / PRODUCTS	CU YD/T	9.19	5.65	4.90	4.64			
* I+A IN FLOT. CONC.	PERCENT	4.57	4.21	3.99	4.10			

FIGURES OF MERIT	UNIT	ECON. LEVEL						
OVERBURDEN	FT	88 MAX	1.91	1.28	1.02	.93		
MATRIX	FT	3 MIN	3.00	5.33	6.67	8.67		
MATRIX BPL	PERCENT	10 MIN	.93	1.01	.99	.97		
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	.81	.84	.87	.83		
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.03	1.06	1.10	1.05		
OVERBURDEN/MATRIX	RATIO	2 MAX	.39	.46	.47	.55		
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	4.36	1.90	3.10	3.57		
I+A IN FLOT. CONC.	PERCENT	5 MAX	1.09	1.19	1.25	1.22		
PRODUCTS RECOVERY	T/AC-FT	400 MIN	.44	.71	.82	.87		
BPL (+150) RECOVERY	PERCENT	63 MIN	.74	.85	.86	.88		
MATRIX/PRODUCTS	CU YD/T	6 MAX	.65	1.06	1.22	1.29		

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES, OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

TABLE CL-III (CONT.)

ECONOMIC FACTORS - FIGURES OF MERIT

INDIVIDUAL MATRICES WELL NO. CL-05

MATRIX NO.		1
DEPTH INTERVAL, FT.		91-113
ECONOMIC FACTORS *	UNIT (M=1000)	
* OVERBURDEN	FT.	91.00
	MT/AC	178.4
* MATRIX	FT.	22.00
	MT/AC	55.1
* BPL IN MATRIX	PERCENT	15.49
	MT/AC	8.5
* OVERBURDEN/MATRIX	RATIO	4.14
WASH-SCREEN PRODUCTS		
+16 MESH	MT/AC	3.7
-16+150 MESH	MT/AC	27.6
-150 MESH (LOSS)	MT/AC	23.8
* FLOTATION CONCENTRATE PRODUCT	MT/AC	9.2
TOTAL USEFUL PRODUCTS**	MT/AC	12.9
BPL RECOVERY		
+16 MESH	MT/AC	.5
* -16+150 (FLOT. CONC.)	PERCENT BPL	57.7
* -16+150 (FLOT. CONC.)	MT/AC	5.3
* TOTAL	MT/AC	5.8
* RECOVERED FROM MATRIX	PERCENT	67.74
* OVERBURDEN / PRODUCT	CU YD/T	8.9
* MATRIX / PRODUCTS	CU YD/T	2.76
* I+A IN FLOT. CONC.	PERCENT	3.77

FIGURES OF MERIT	UNIT	ECON. LEVEL	
OVERBURDEN	FT	88 MAX	.97
MATRIX	FT	3 MIN	7.33
MATRIX BPL	PERCENT	10 MIN	1.55
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	.87
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.11
OVERBURDEN/MATRIX	RATIO	2 MAX	.48
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	1.96
I+A IN FLOT. CONC.	PERCENT	5 MAX	1.33
PRODUCTS RECOVERY	T/AC-FT	400 MIN	1.46
BPL (+150) RECOVERY	PERCENT	63 MIN	1.08
MATRIX/PRODUCTS	CU YD/T	6 MAX	2.18

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

COLQUITT COUNTY

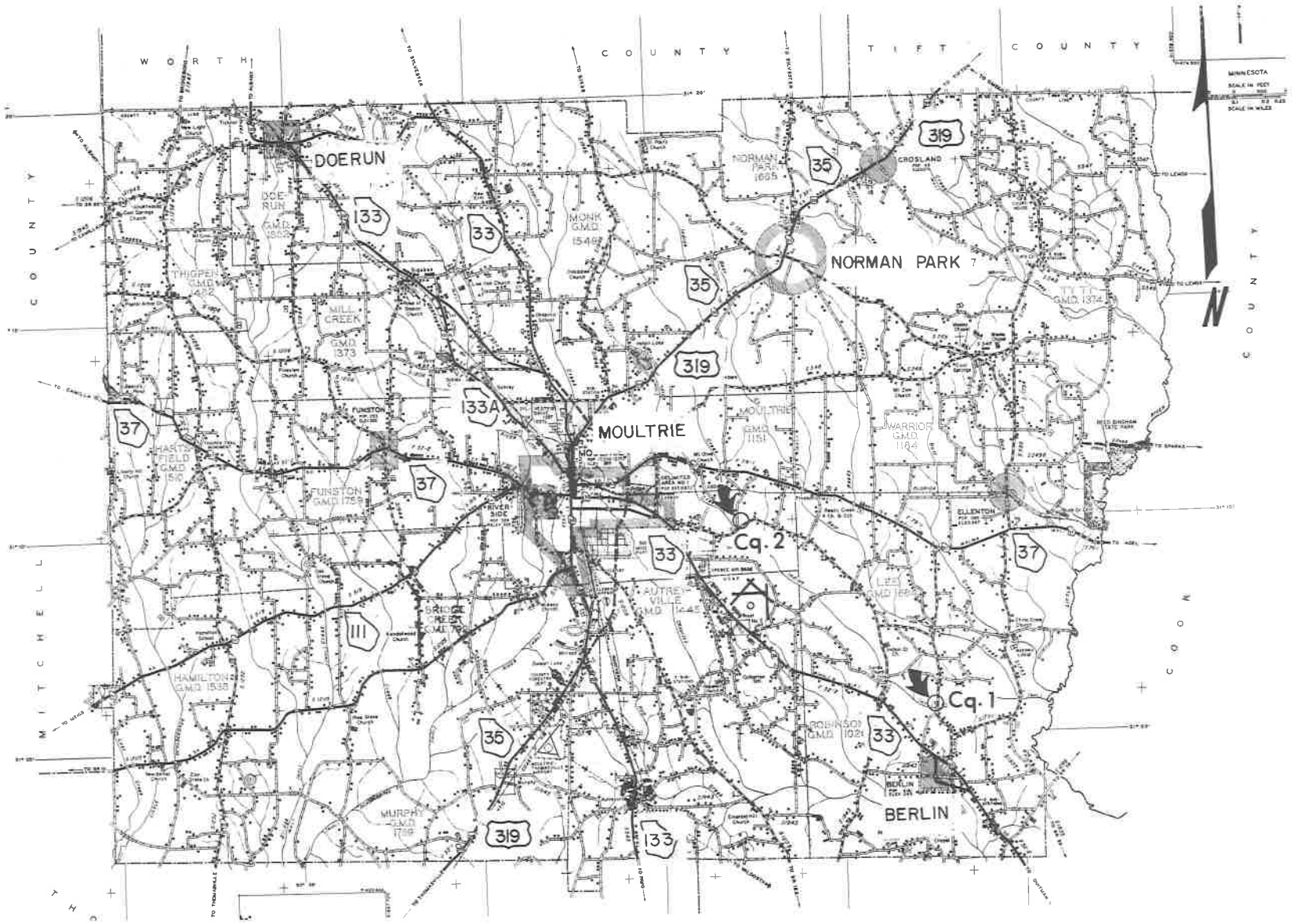
COLQUITT COUNTY

SUMMARY OF RESULTS

The holes in Colquitt County were drilled primarily for fuller's earth, but phosphorite was checked.

Phosphorite content was insufficient for beneficiation.

No logs were run on these holes because of a priority use of the logging equipment in another part of the state in conjunction with the other drilling rig.



1 0 1 2 3 4

SCALE IN MILES

COLQUITT COUNTY

GEORGIA

Figure CQ-1. Location of Holes - Colquitt County

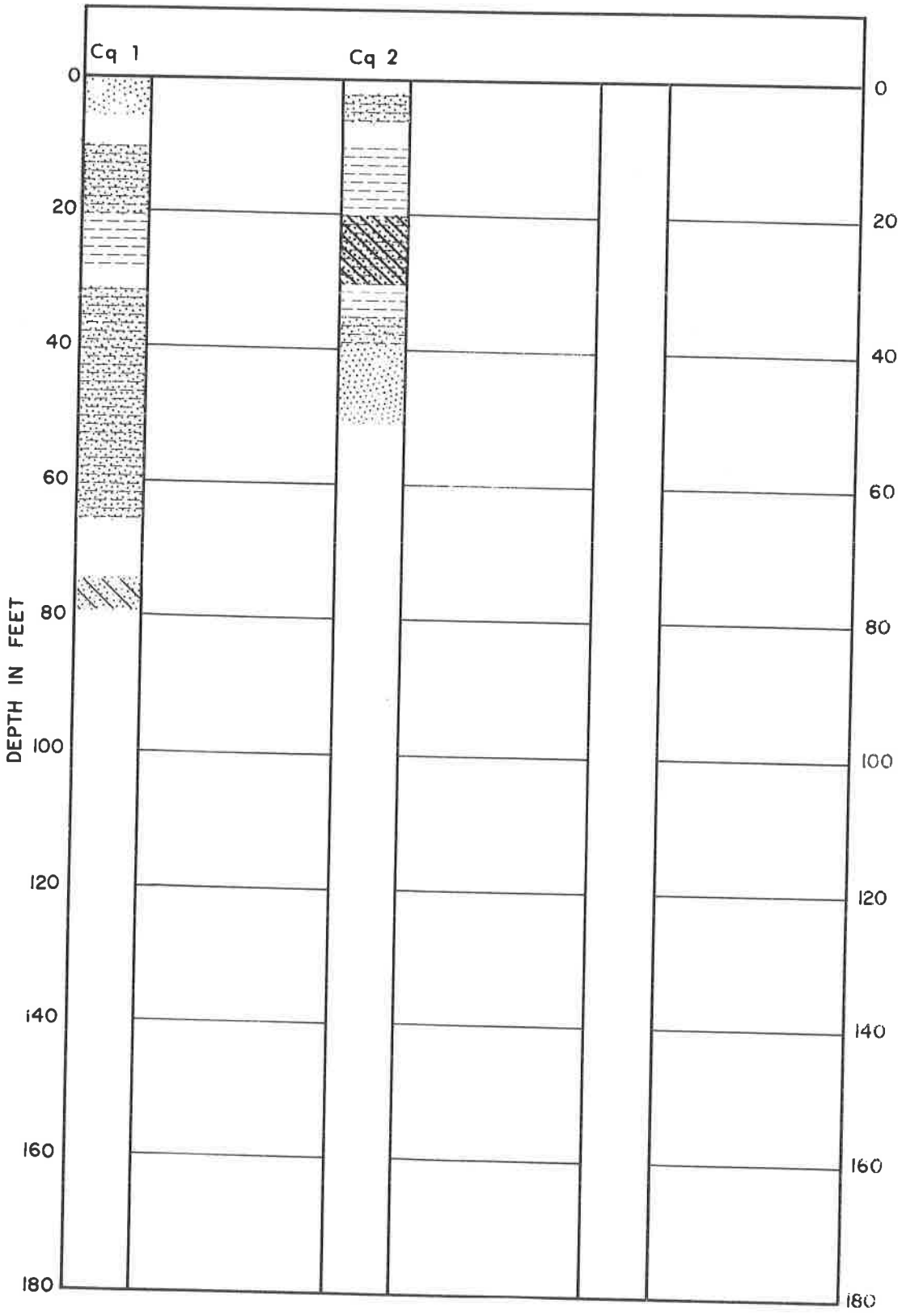


Figure Cq-3. Lithologic Logs - Colquitt County

TABLE CQ-I

BPL DETERMINATION ON CORES

Colquitt County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Cq-1	224	0-5	2	40	0
		5-10	0	0	-
		10-20	10	100	0
		20-28	8	100	0
		28-30	2	100	-
		30-40	9	90	.34
		40-50	8	80	1.35
		50-57	7	100	5.40
		57-65	8	100	6.74
		65-75	0	0	-
		75-80	2	40	1.01
Cq-2	260	0-2	-	-	-
		2-6	4	100	0
		6-10	-	-	-
		10-20	4	40	4.72
		20-30	10	100	3.20
		30-35	5	100	6.10
		35-40	5	100	3.14
		40-50	1	10	2.70

CRAWFORD COUNTY

CRAWFORD COUNTY

SUMMARY OF RESULTS

The one hole drilled in Crawford County was to check the extent of a kaolin lense noted in surface geology. This will be reported in later clay commodity study.

Since phosphorite is reported on occasions from older formations of the Coastal Plain, a systematic check was made of samples. No phosphorite was found. Cave-in of the hole prevented the obtaining of electric logs. The gamma-ray log was run inside the drill pipe.

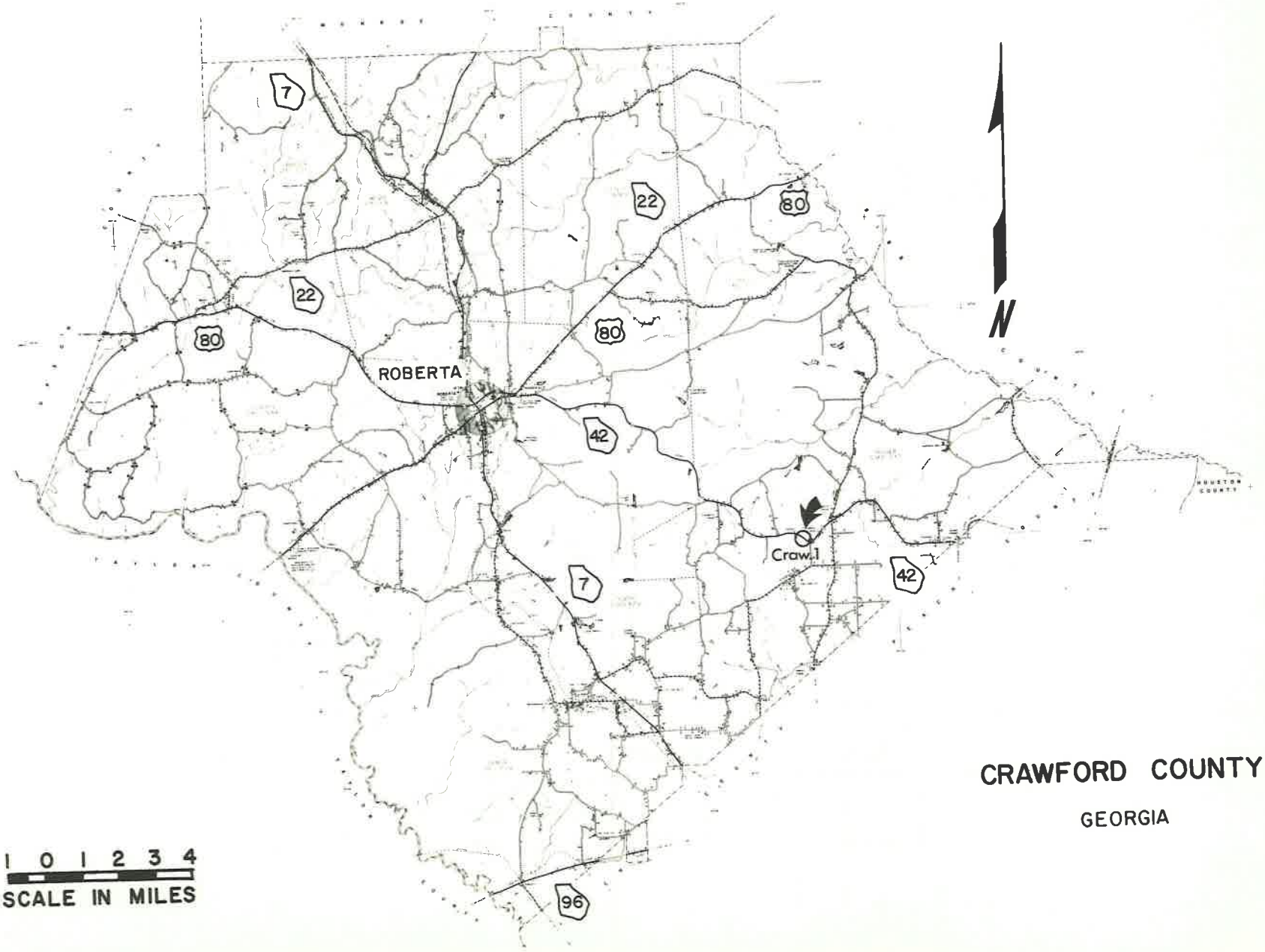


Figure CRAW-1. Location of Holes - Crawford County

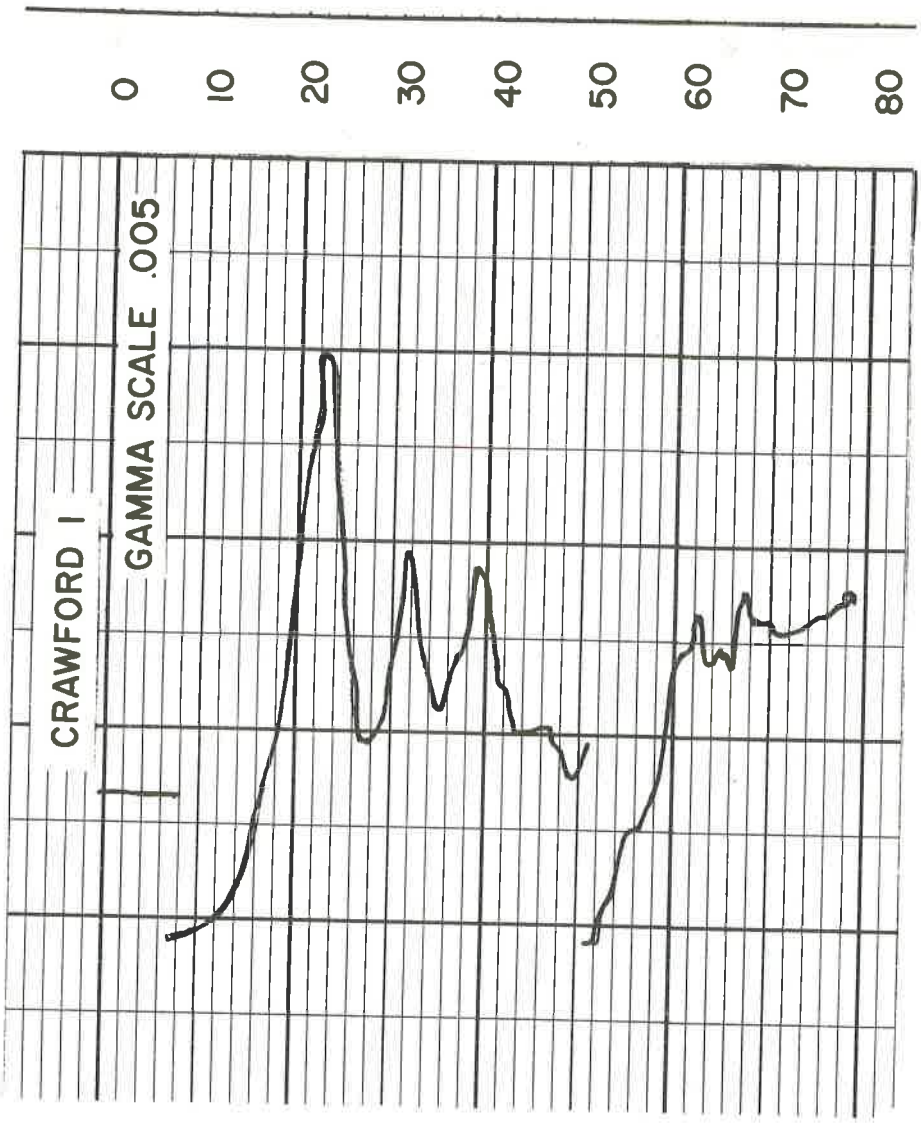


Figure CRAW-2. Gamma-Ray Logs - Crawford County
Hole Craw-1

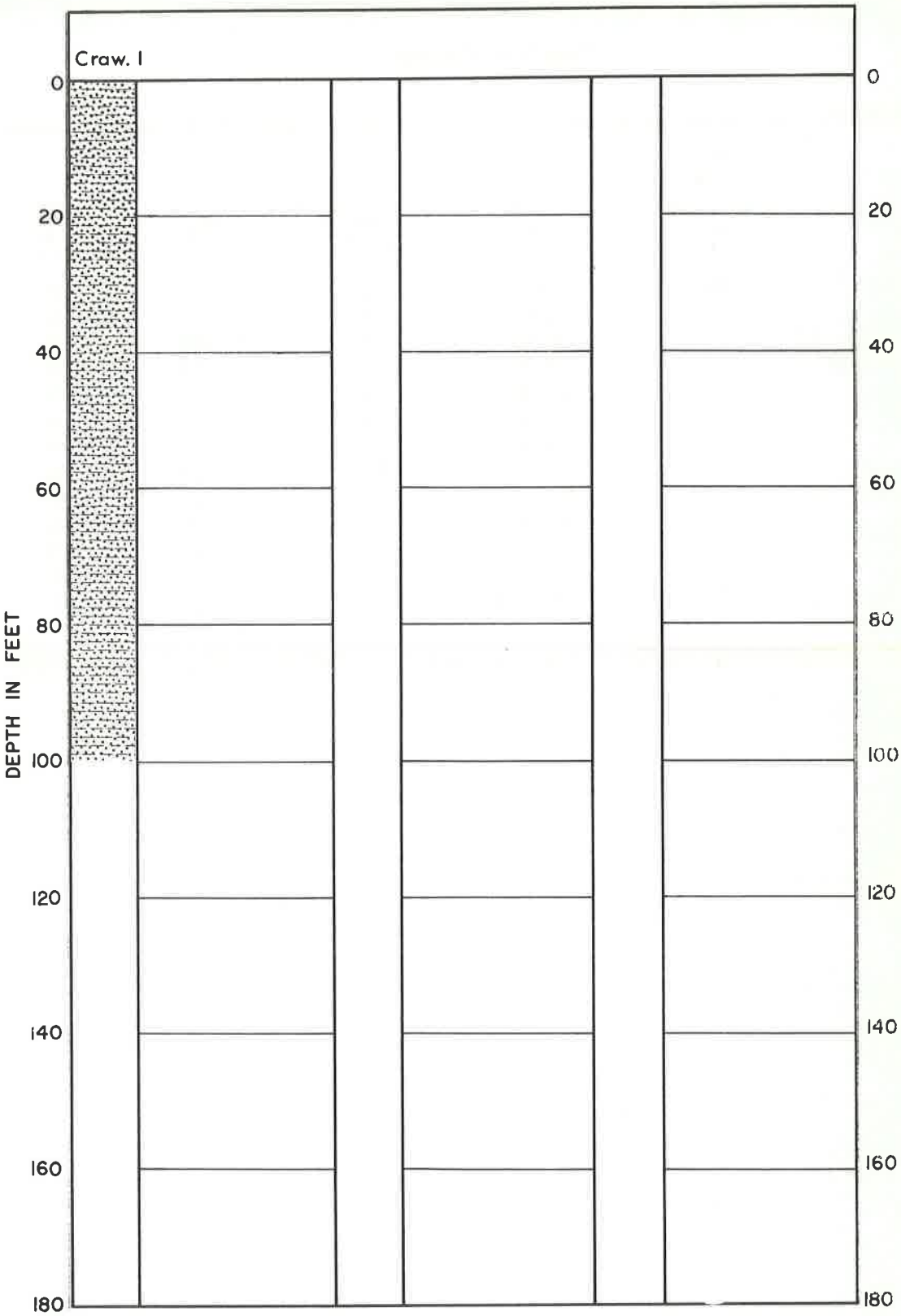


Figure Craw-3. Lithologic Logs - Crawford County

TABLE CRAW-I

BPL DETERMINATION ON CORES

Crawford County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Craw-1	564	0-3	2	67	0
		3-6	2	67	0
		6-9	3	100	0
		9-12	2	67	0
		12-15	2	67	0
		15-30	6	40	0
		30-45	2	13	0
		45-60	11	73	0
		60-65	5	100	0
		65-70	5	100	0
		70-75	5	100	0
		75-90	15	100	0
		90-100	9	90	0

HOUSTON COUNTY

HOUSTON COUNTY

SUMMARY OF RESULTS

Holes drilled in this county were also for kaolin. Samples were systematically tested for phosphorite. Results were meager.

Cave-in of hole Ho-1 was the reason for not presenting electric log data of that hole. Gamma-ray logs were run inside the drill pipe.

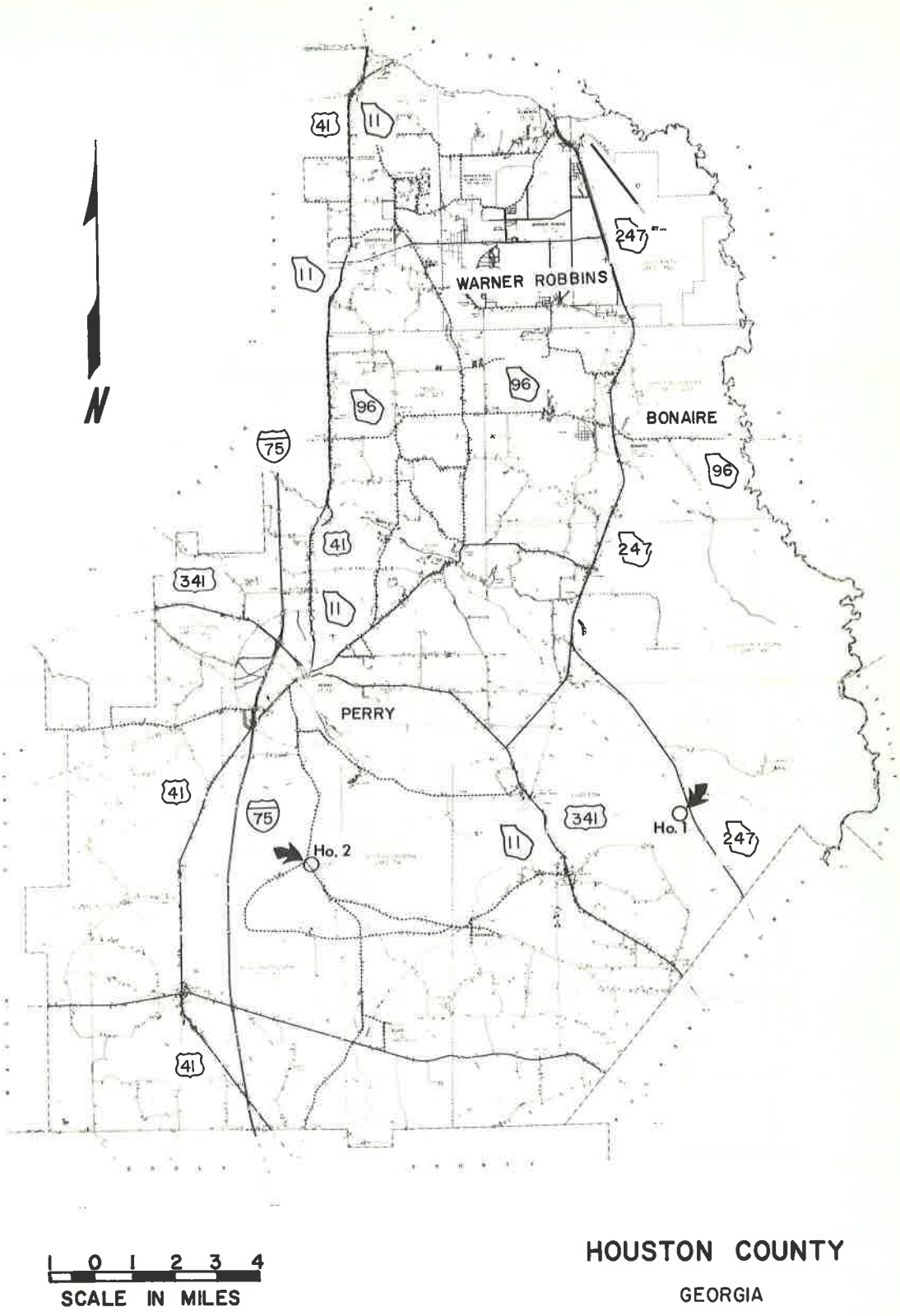


Figure HO-1. Location of Holes - Houston County

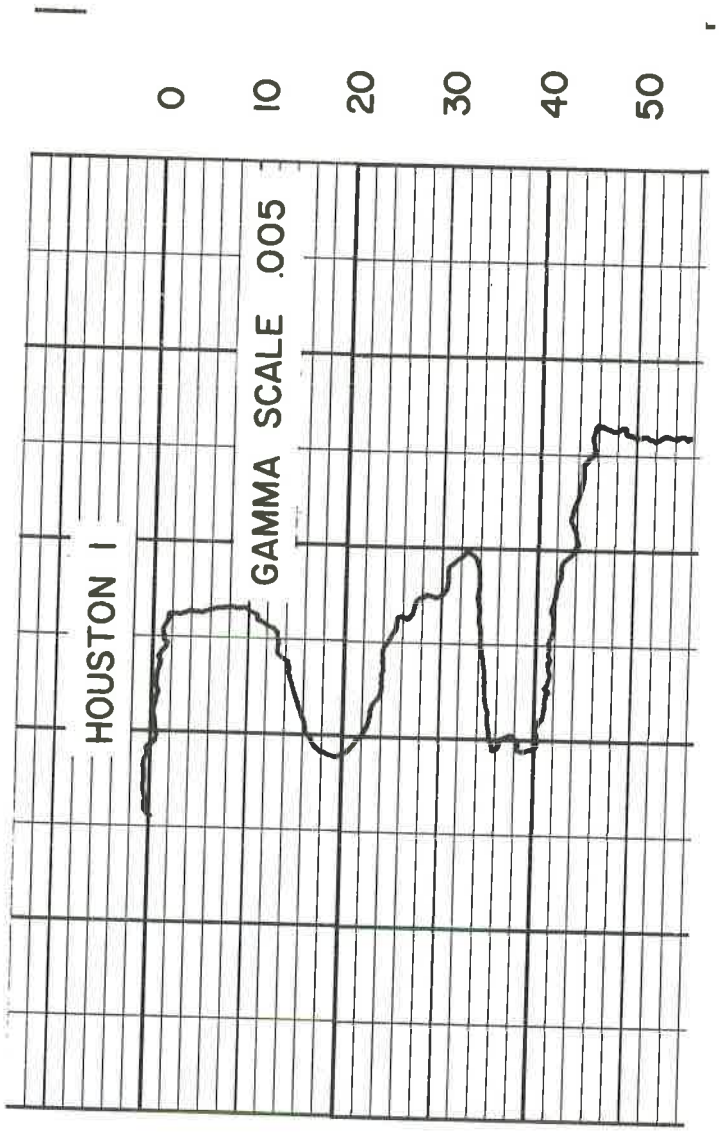


Figure HO-2. Gamma-Ray Logs - Houston County
Hole Ho-1

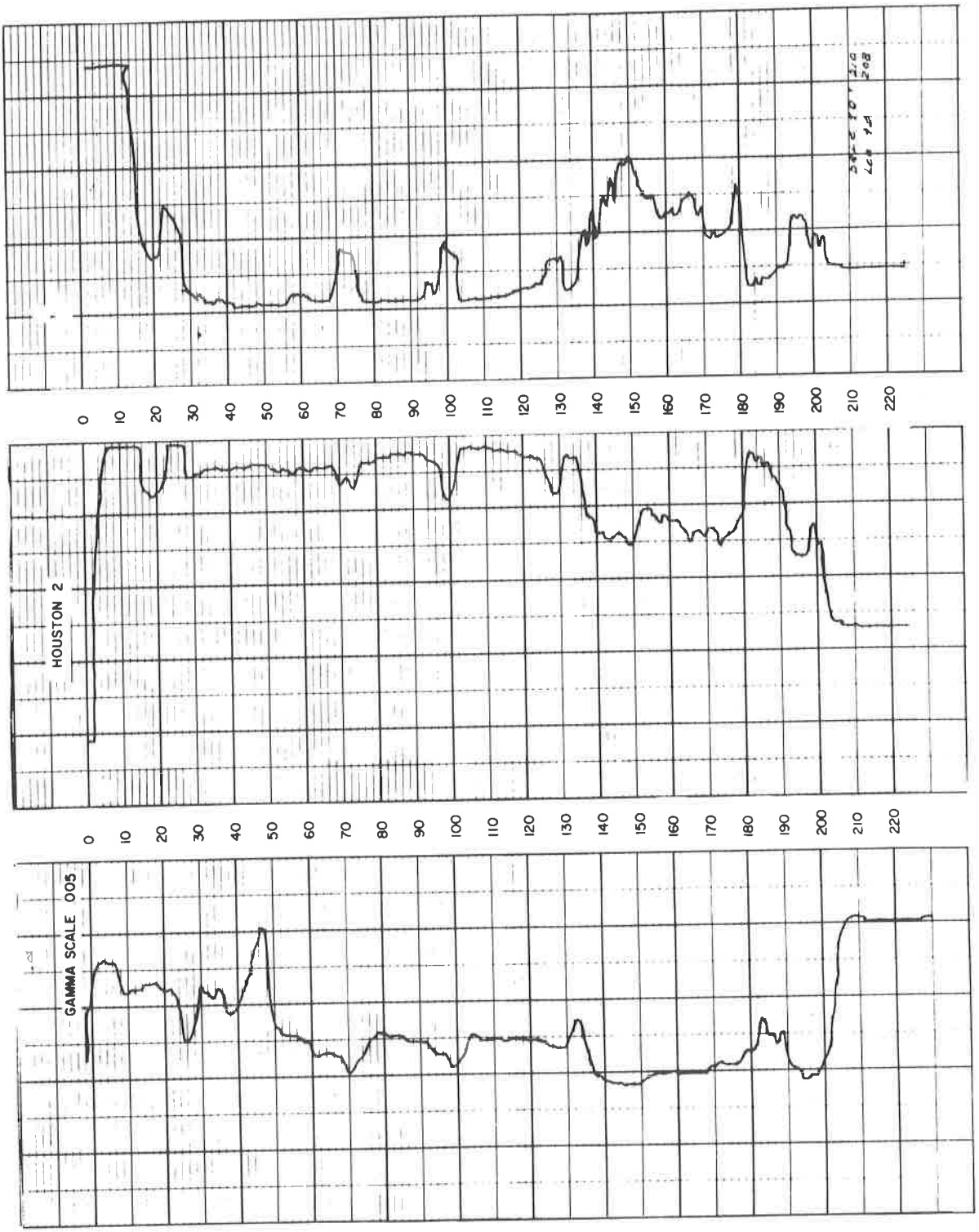


Figure HO-2. Electric and Gamma-Ray Logs - Houston County Hole Ho-2

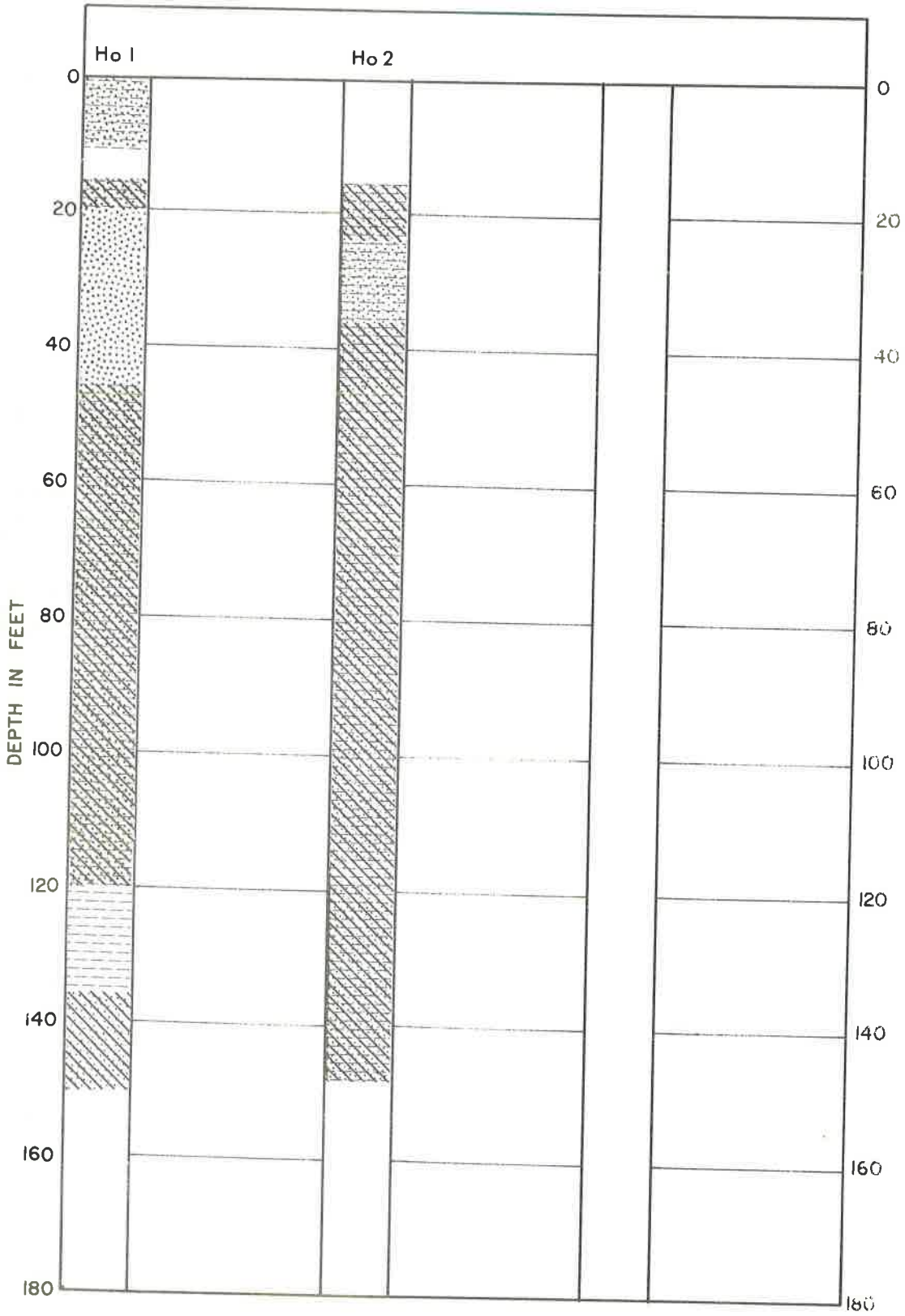


Figure Ho-3. Lithologic Logs - Houston County

TABLE HO-I

BPL DETERMINATION ON CORES

Houston County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Ho-1	400	0-10	7	70	0
		10-15	0	0	-
		15-20	2	40	0
		20-30	1	10	0
		30-45	2	13	0
		45-60	11	78	0.78
		60-75	14	93	0.37
		75-90	10	67	0
		90-105	13	87	0
		105-120	14	93	0
		120-135	10	67	0
		135-150	4	27	0
Ho-2	434	0-5	Wash Sample	-	0
		5-10	Wash Sample	-	0
		10-15	Wash Sample	-	0
		15-23	8	100	0
		23-35	10	83	0
		35-50	15	100	1.15
		50-60	3	30	0.37
		60-71	2	13	0.57
		71-90	5		0
		90-105	9	60	0
		105-125	10	50	0
		125-142	5		0
		142-147	3	60	0
		147-165	-	-	-
		165-170	Wash Sample	-	0
		170-175	Wash Sample	-	0
		175-180	Wash Sample	-	0
		180-185	Wash Sample	-	0
		185-190	Wash Sample	-	0.71
		190-195	Wash Sample	-	0
		195-200	Wash Sample	-	0
		200-205	Wash Sample	-	0
		205-210	Wash Sample	-	0

LOWNDES COUNTY

LOWNDES COUNTY

SUMMARY OF RESULTS

New Lowndes County holes drilled are 10 through 14. Only the area near hole 12 seems to warrant additional study. This is based on thickness of matrix, low overburden, and ability to be beneficiated to 75% BPL.

Electric logs were not run on hole Lo-14 because of caving hole conditions.

The gamma-ray log was run inside the drill pipe.

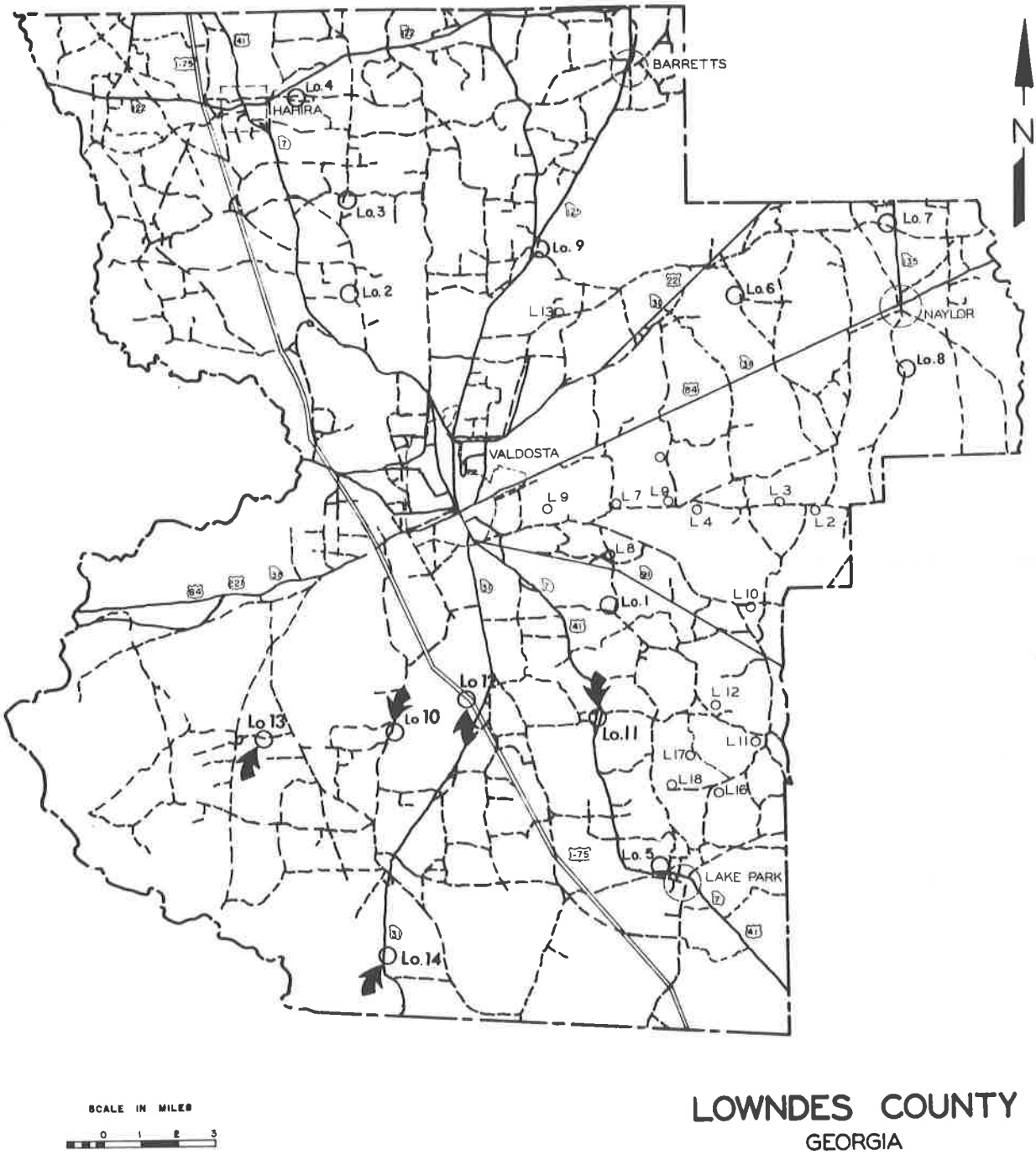


Figure LO-1. Location of Holes - Lowndes County

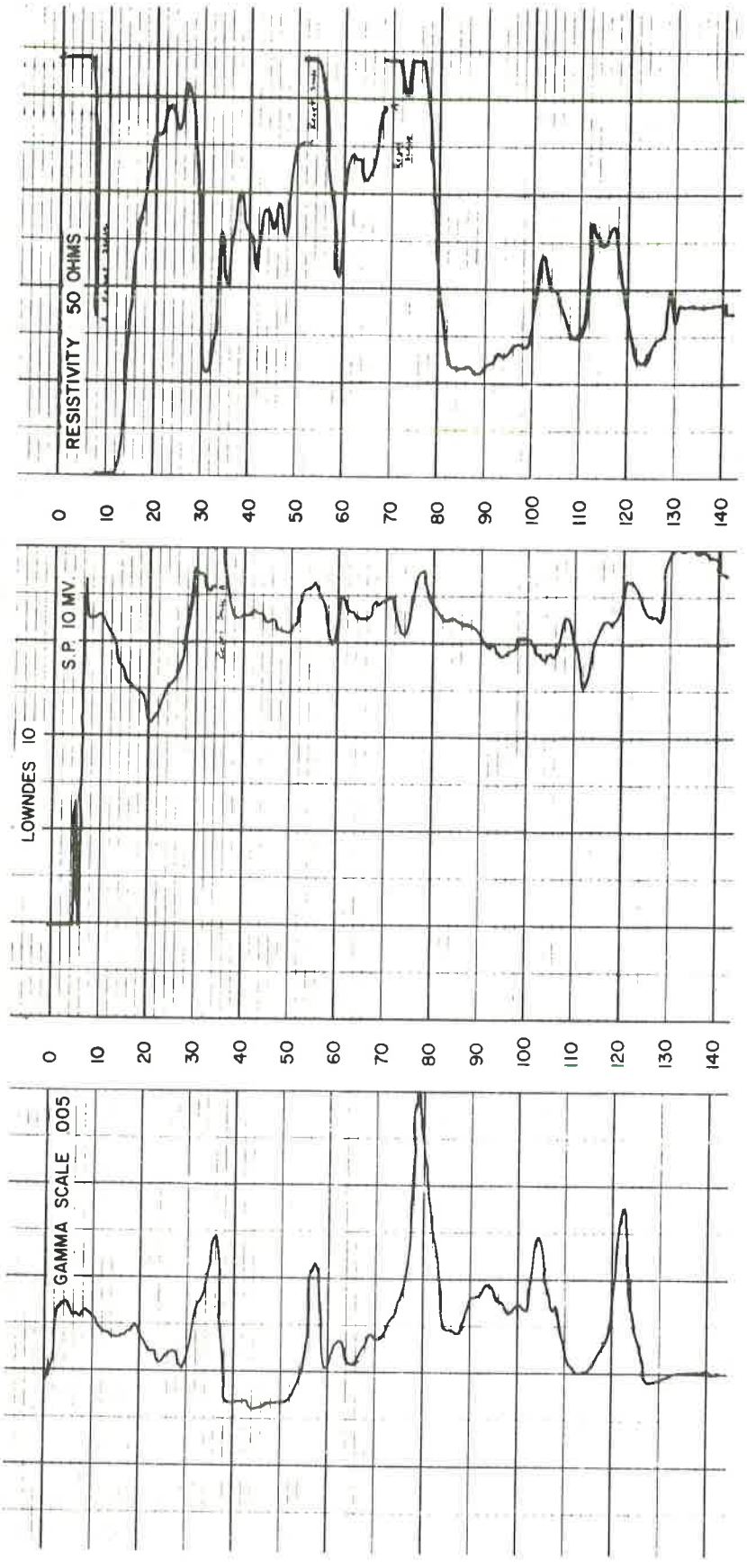


Figure LO-2. Electric and Gamma-Ray Logs - Lowndes County
Hole Lo-10

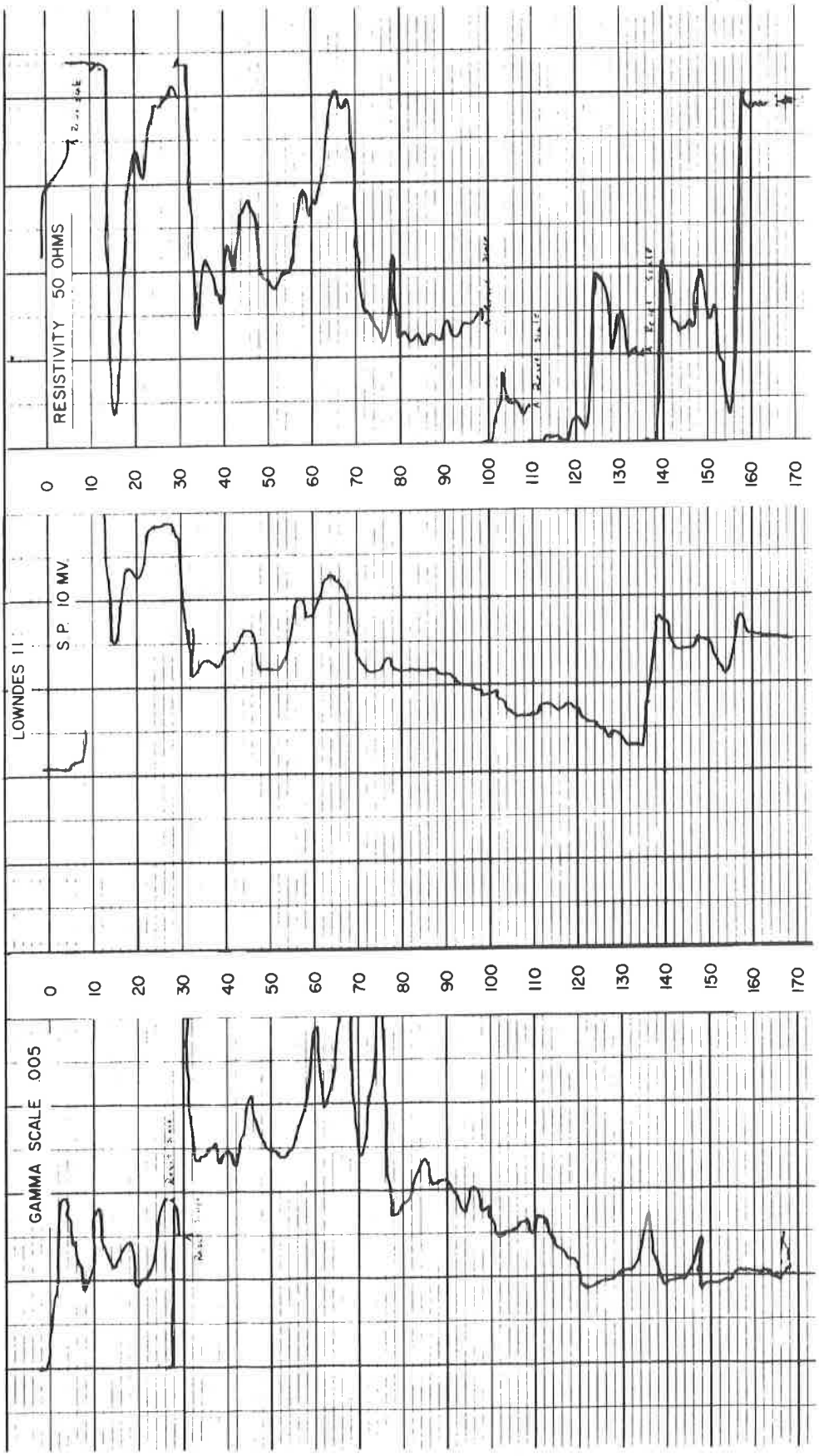


Figure LO-2. Electric and Gamma-Ray Logs - Lowndes County
Hole Lo-11

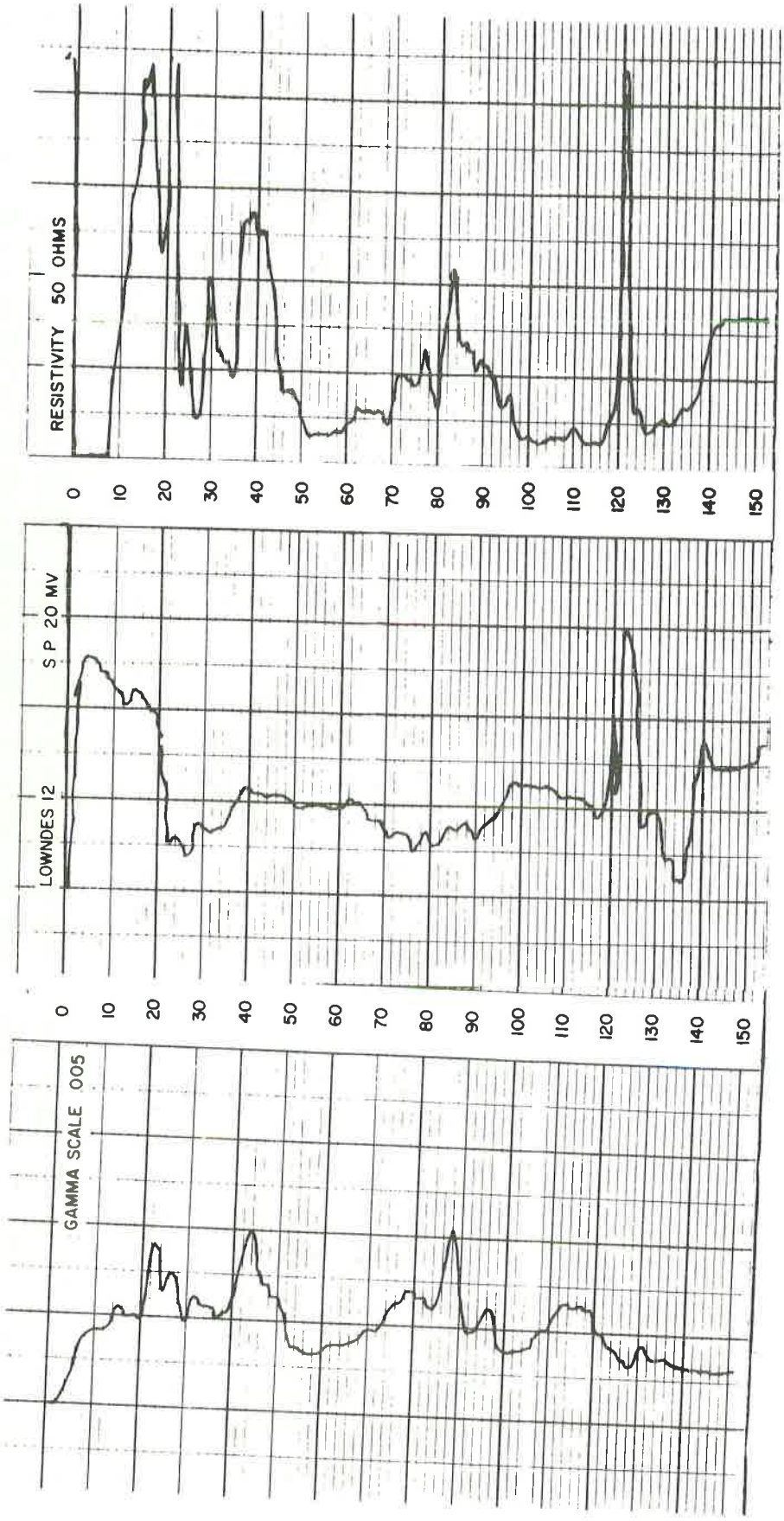


Figure LO-2. Electric and Gamma-Ray Logs - Lowndes County
Hole Lo-12

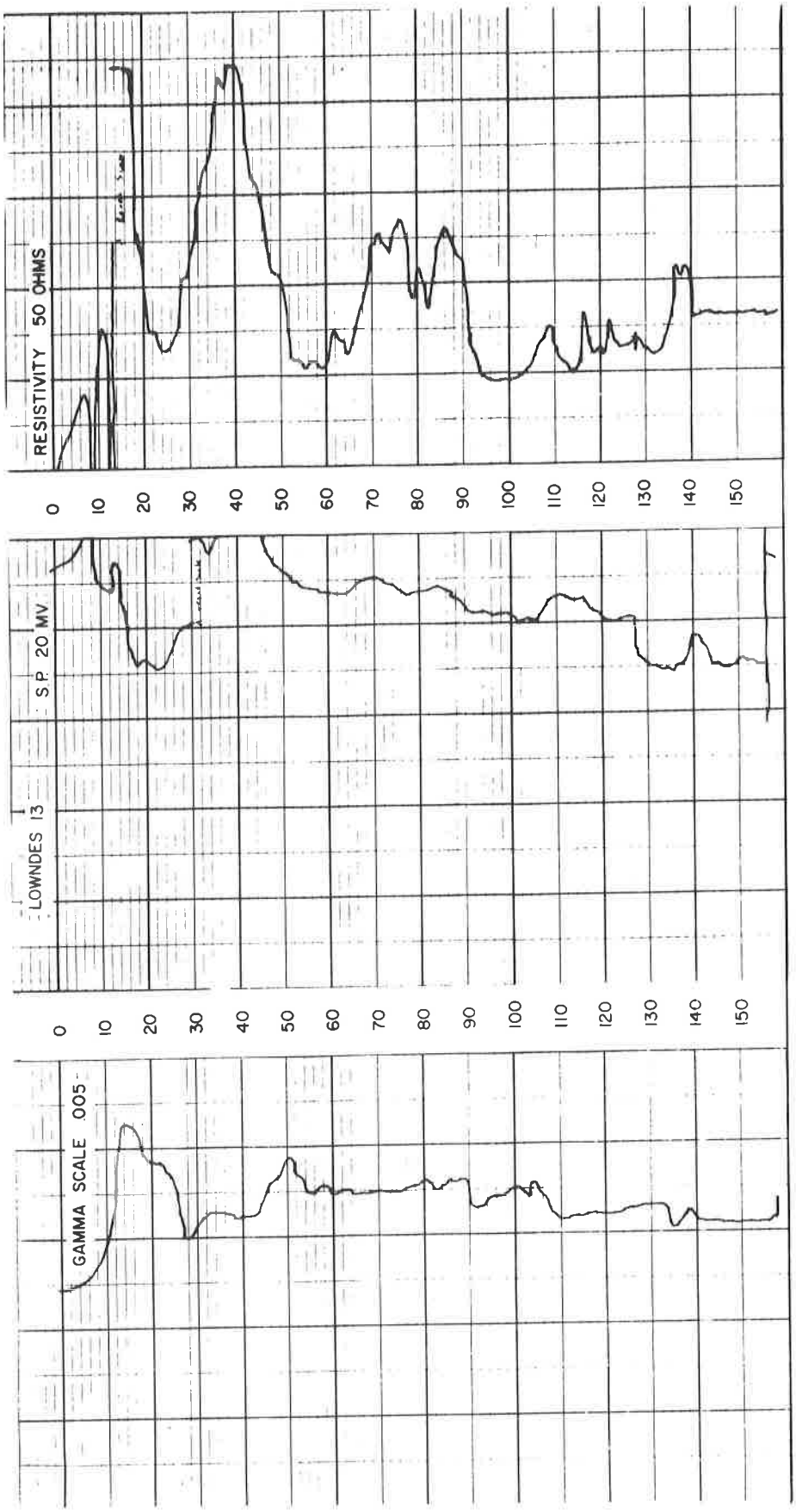


Figure LO-2. Electric and Gamma-Ray Logs - Lowndes County
Hole Lo-13

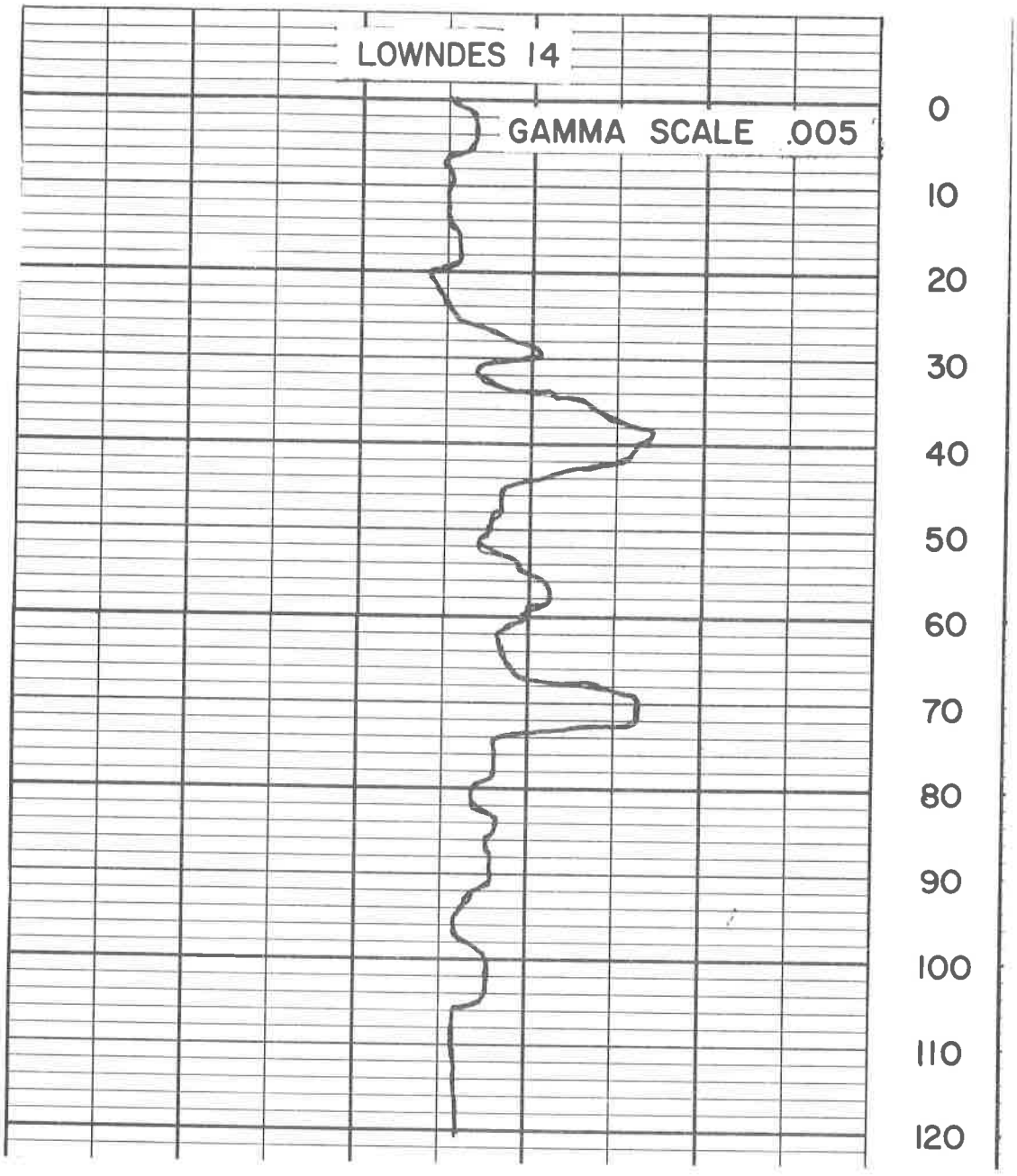


Figure LO-2. Electric and Gamma-Ray Logs - Lowndes County Hole Lo-14

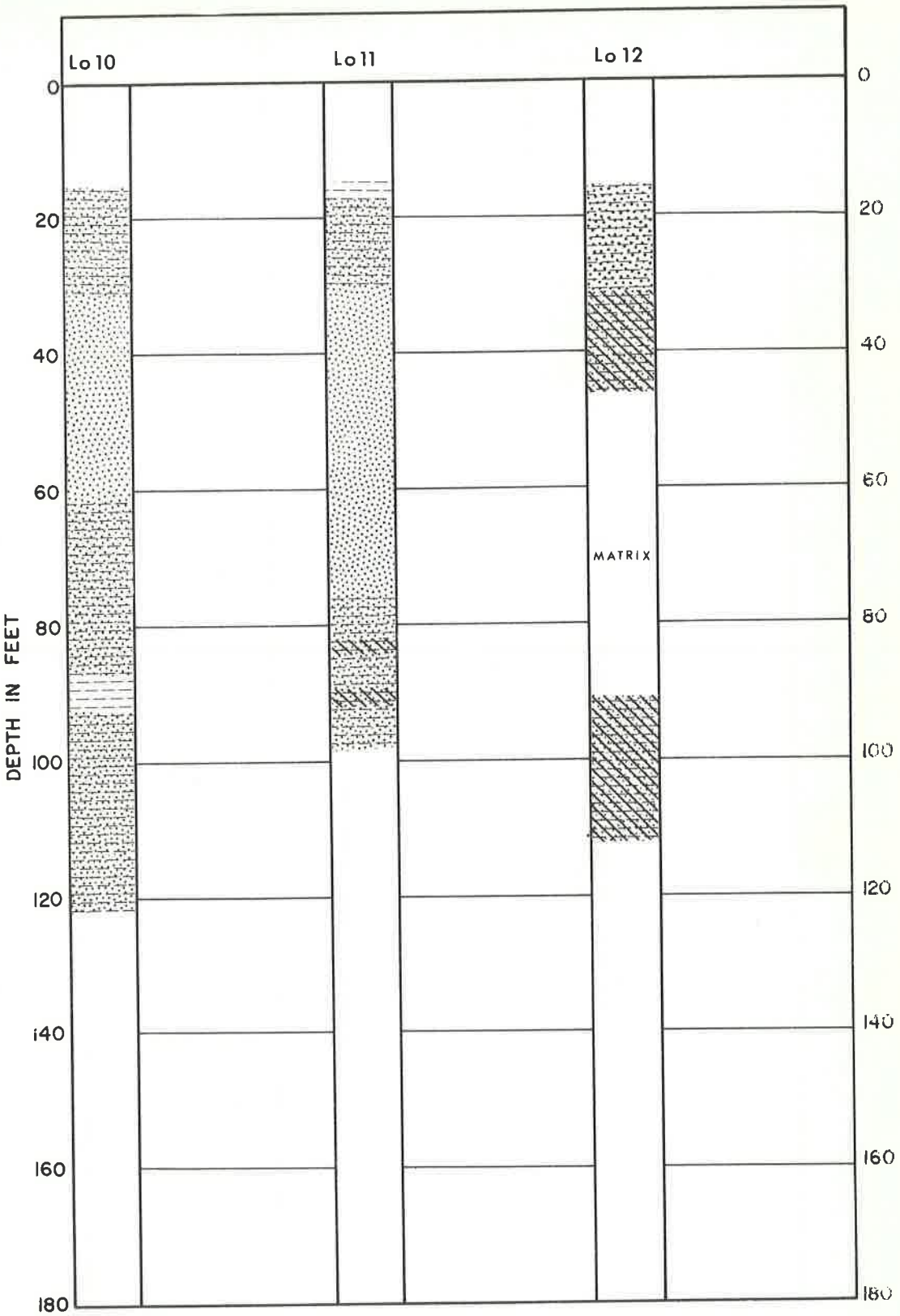


Figure Lo-3. Lithologic Logs - Lowndes County

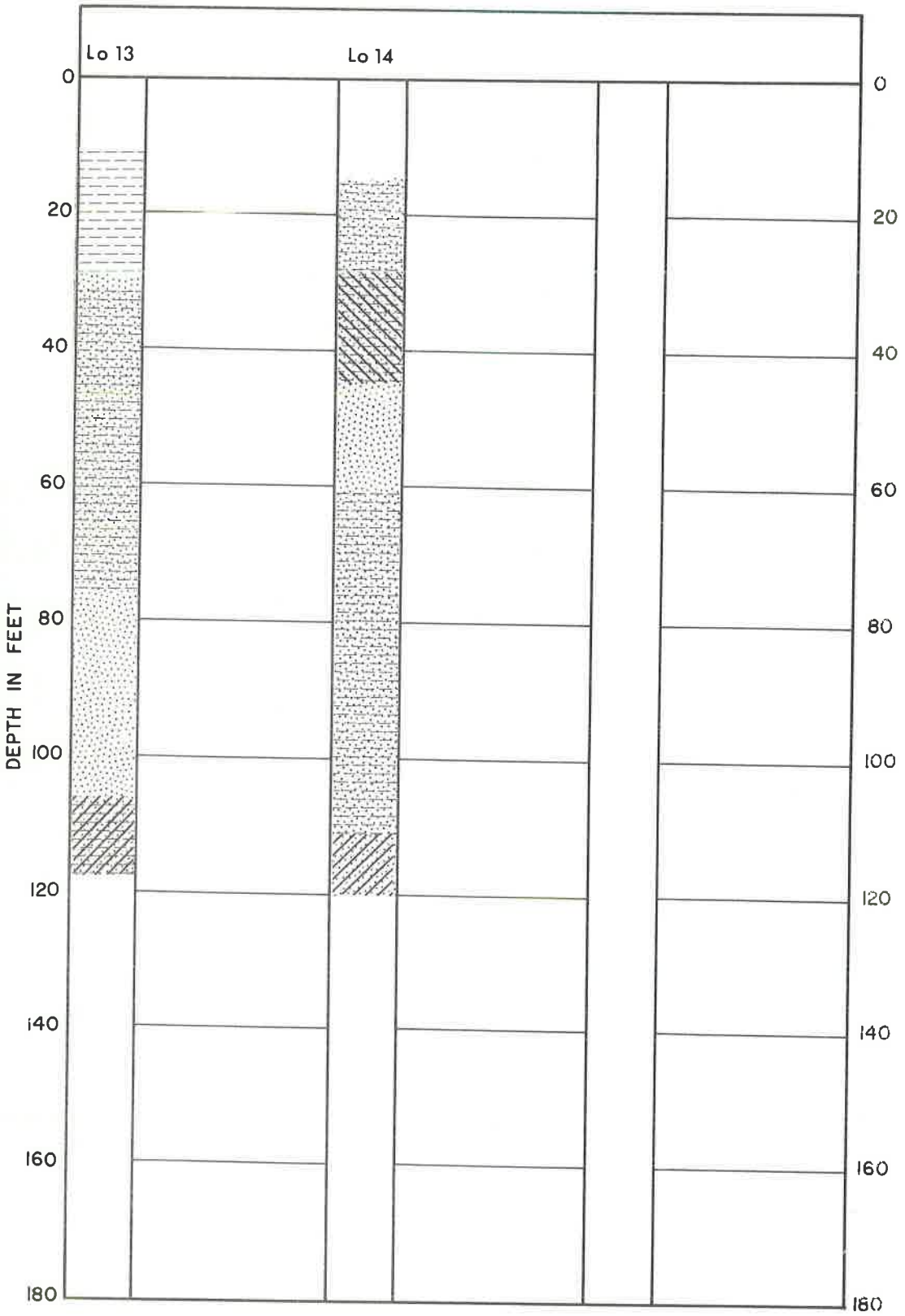


Figure Lo-3. Lithologic Logs - Lowndes County (Cont.)

TABLE LO-I

BPL DETERMINATION ON CORES

Lowndes County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Lo-10	208	0-15	Wash Sample	-	0
		15-19	3	75	0
		25-31	5	83	0
		31-51	5	50	0
		51-61	4	40	0
		61-76	-	-	-
		76-81	5	100	3.03
		81-86	5	100	6.37
		86-91	2	33	9.98
		91-94	3	100	7.79
		94-98	4	100	7.96
		98-101	3	100	8.70
		101-107	-	-	-
		107-112	3	60	3.71
		112-121	2	22	.34
		121-125	Wash Sample	-	1.01
		125-130	Wash Sample	-	1.01
		130-135	Wash Sample	-	.67
Lo-11	178	0-5	Wash Sample	-	0
		5-10	Wash Sample	-	0
		10-15	Wash Sample	-	0
		15-17	2	100	.88
		17-30	3	23	1.79
		30-45	2	13	7.49
		45-60	-	-	-
		60-75	3	20	16.29
		75-82	7	100	7.01
		82-84	2	100	32.17
		84-90	6	100	4.18
		90-92	2	100	9.61
		92-94	2	100	9.27
		94-96	1	50	3.37
		96-98	1	50	3.17
		98-105	-	-	-
		105-110	Wash Sample	-	5.53
		110-115	Wash Sample	-	4.82
		115-120	Wash Sample	-	3.47
		120-125	Wash Sample	-	1.85
		125-130	Wash Sample	-	1.69
		130-135	Wash Sample	-	1.52

(Continued)

TABLE LO-I (Continued)

BPL DETERMINATION ON CORES

Lowndes County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Lo-11	178	135-140	Wash Sample	-	1.82
		140-145	Wash Sample	-	1.52
		145-150	Wash Sample	-	1.85
		150-155	Wash Sample	-	3.14
		155-160	Wash Sample	-	2.43
Lo-12	201	0-5	Wash Sample	-	.13
		5-10	Wash Sample	-	.61
		10-15	Wash Sample	-	.27
		15-19	4	100	0
		19-31	5	42	0
		31-46	3	20	1.52
		46-61	11	67	13.69
		61-76	15	100	11.43
		76-91	2	40	14.97
		91-98	2	29	4.05
		98-112	9	16	1.72
		112-121	3	33	1.18
		121-125	Wash Sample	-	3.37
		125-130	Wash Sample	-	3.51
		130-135	Wash Sample	-	2.56
		135-140	Wash Sample	-	4.05
		140-145	Wash Sample	-	4.82
		145-150	Wash Sample	-	3.27
Lo-13	196	0-15	Wash Sample	-	0
		15-16	-	-	-
		16-29	13	100	.67
		29-31	1	50	0
		31-46	3	43	.34
		46-49	3	100	.67
		49-61	7	58	1.35
		61-76	14	93	3.17
		76-91	10	67	9.48
		91-106	10	67	3.20
		106-117	7	63	.44

(Continued)

TABLE LO-I (Continued)

BPL DETERMINATION ON CORES

Lowndes County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Lo-14	200	0-15	-	-	-
		15-18	1	33	.27
		18-21	2	67	.27
		21-25	2	50	.34
		25-29	1	25	0
		29-45	4	25	1.55
		45-60	4	27	2.29
		60-75	5	33	11.46
		75-90	7	47	6.17
		90-99	9	100	8.50
		99-111	5	42	2.66
		111-113	1	50	.54
		113-120	1	14	1.35

TABLE LO-II

MATRIX BENEFICIATION RESULTS

LOWNDES COUNTY

HOLE NO. LO-10 MATRIX INTERVAL = 86-91

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	5										
DRY DENSITY LB/CU FT											
PERCENT DRY WEIGHT	100.0	0	.03	.25	8.15						
PERCENT BPL	11.23			2.70	1.01						
PERCENT ACID INSOL	71.75			93.10	97.51						
PERCENT IRON OXIDE	6.72										
PERCENT ALUM OXIDE	14.10										
PERCENT CALC OXIDE	4.41										

NOTE: WORK ON THE MATRIX WAS DISCONTINUED AFTER THE FLOTATION FEED WAS FOUND TO CONTAIN LESS THAN 7% BPL.

TABLE LO-II (CONT.)

MATRIX BENEFICIATION RESULTS

LOWNDES COUNTY

HOLE NO. LO-11 MATRIX INTERVAL = 60-84

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	24										
DRY DENSITY LB/CU FT	.00										
PERCENT DRY WEIGHT	100.0	1.55	1.19	1.38	57.69						
PERCENT BPL	12.51	64.31	65.32	62.32	5.19						
PERCENT ACID INSOL	81.24	19.98	17.37	20.58	93.56						
PERCENT IRON OXIDE	1.24	.39	.46	.60	.22						
PERCENT ALUM OXIDE	4.46	.96	1.22	1.35	.96						
PERCENT CALC OXIDE	4.90	43.02	42.32	40.58	1.82						

NOTE: WORK ON THE MATRIX WAS DISCONTINUED AFTER THE FLOTATION FEED WAS FOUND TO CONTAIN LESS THAN 7% BPL.

TABLE LO-II (CONT.)

MATRIX BENEFICIATION RESULTS

LOWNDES COUNTY

HOLE NO. LO-11 MATRIX INTERVAL = 90-94

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	4										
DRY DENSITY LB/CU FT	.00										
PERCENT DRY WEIGHT	100.0	.88	.80	2.67	28.99						
PERCENT BPL	9.31	1.11	5.70	9.00	3.98						
PERCENT ACID INSOL	74.38	11.42	33.74	52.17	88.34						
PERCENT IRON OXIDE	2.26	.37	1.52	2.43	.81						
PERCENT ALUM OXIDE	6.46	.92	3.67	5.72	2.58						
PERCENT CALC OXIDE	4.69	29.03	20.64	10.98	1.86						

NOTE: WORK ON THE MATRIX WAS DISCONTINUED AFTER THE FLOTATION FEED WAS FOUND TO CONTAIN LESS THAN 7% BPL

TABLE LO-II (CONT.)

MATRIX BENEFICIATION RESULTS

LOWNDES COUNTY

HOLE NO. LO-12 MATRIX INTERVAL = 46-91

	FEED	+4 *	4X8*	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	45										
DRY DENSITY LB/CU FT	68.36										
PERCENT DRY WEIGHT	100.0	.00	.00	.40	45.22	2.85	42.37	54.39	10.29	83.66	6.05
PERCENT BPL	12.98	.00	.00	44.58	10.72	20.74	10.32	14.63	75.87	2.02	12.81
PERCENT ACID INSOL	77.75	.00	.00	34.90	86.04	72.09	86.63	71.17	5.38	96.83	83.79
PERCENT IRON OXIDE	2.19	.00	.00	3.05	.48	.66	.39	3.61	.86	.11	.75
PERCENT ALUM OXIDE	6.88	.00	.00	4.36	3.07	1.93	2.68	10.07	1.35	2.31	2.29
PERCENT CALC OXIDE	5.11	.00	.00	26.93	4.13	8.40	3.85	5.77	41.98	.50	6.72

(*) WEIGHTS OF THESE TWO FRACTIONS WERE TOO SMALL FOR ANALYSIS; THEREFORE THE +4, 4 x 8 AND THE 8 x 16 WERE COMBINED INTO A SINGLE FRACTION AND ANALYZED.

TABLE LO-II (CONT.)

MATRIX BENEFICIATION RESULTS

LOWNDES COUNTY

HOLE NO. LO-14 MATRIX INTERVAL = 72-75

	FEED	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE	3										
DRY DENSITY LB/CU FT											
PERCENT DRY WEIGHT	100.0	.03	.17	.73	65.30						
PERCENT BPL	14.87				5.73						
PERCENT ACID INSOL	79.95				92.40						
PERCENT IRON OXIDE	.82										
PERCENT ALUM OXIDE	2.84										
PERCENT CALC OXIDE	5.95										

NOTE: WORK ON THE MATRIX WAS DISCONTINUED AFTER THE FLOTATION FEED WAS FOUND TO CONTAIN LESS THAN 7% BPL

TABLE LO-III

ECONOMIC FACTORS - FIGURES OF MERIT

INDIVIDUAL MATRICES — WELL NO. LO-12

MATRIX NO.		1
DEPTH INTERVAL, FT.		46- 91
ECONOMIC FACTORS *	UNIT (M=1000)	
* OVERBURDEN	FT.	46.00
	MT/AC	90.2
* MATRIX	FT.	45.00
	MT/AC	67.0
* BPL IN MATRIX	PERCENT	12.98
	MT/AC	8.7
* OVERBURDEN/MATRIX	RATIO	1.02
WASH-SCREEN PRODUCTS		
+16 MESH	MT/AC	.3
-16+150 MESH	MT/AC	30.3
-150 MESH (LOSS)	MT/AC	36.4
* FLOTATION CONCENTRATE PRODUCT	MT/AC	3.1
TOTAL USEFUL PRODUCTS**	MT/AC	3.4
BPL RECOVERY		
+16 MESH	MT/AC	.1
* -16+150 (FLOT. CONC.)	PERCENT BPL	75.9
* -16+150 (FLOT. CONC.)	MT/AC	2.4
* TOTAL	MT/AC	2.5
* RECOVERED FROM MATRIX	PERCENT	28.56
* OVERBURDEN / PRODUCT	CU YD/T	28.9
* MATRIX / PRODUCTS	CU YD/T	21.46
* I+A IN FLOT. CONC.	PERCENT	2.21

FIGURES OF MERIT	UNIT	ECON. LEVEL	
OVERBURDEN	FT	88 MAX	1.91
MATRIX	FT	3 MIN	15.00
MATRIX BPL	PERCENT	10 MIN	1.30
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	1.15
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	1.46
OVERBURDEN/MATRIX	RATIO	2 MAX	1.96
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	.61
I+A IN FLOT. CONC.	PERCENT	5 MAX	2.26
PRODUCTS RECOVERY	T/AC-FT	400 MIN	.19
BPL (+150) RECOVERY	PERCENT	63 MIN	.45
MATRIX/PRODUCTS	CU YD/T	6 MAX	.28

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

PULASKI COUNTY

PULASKI COUNTY

SUMMARY OF RESULTS

Two holes were drilled in Pulaski County for kaolin and routinely tested for phosphorite. Only Pu-1 showed traces.

No electrical logs were run on both holes, due to cave-in conditions, but the gamma-ray logs were run inside the drill pipe.

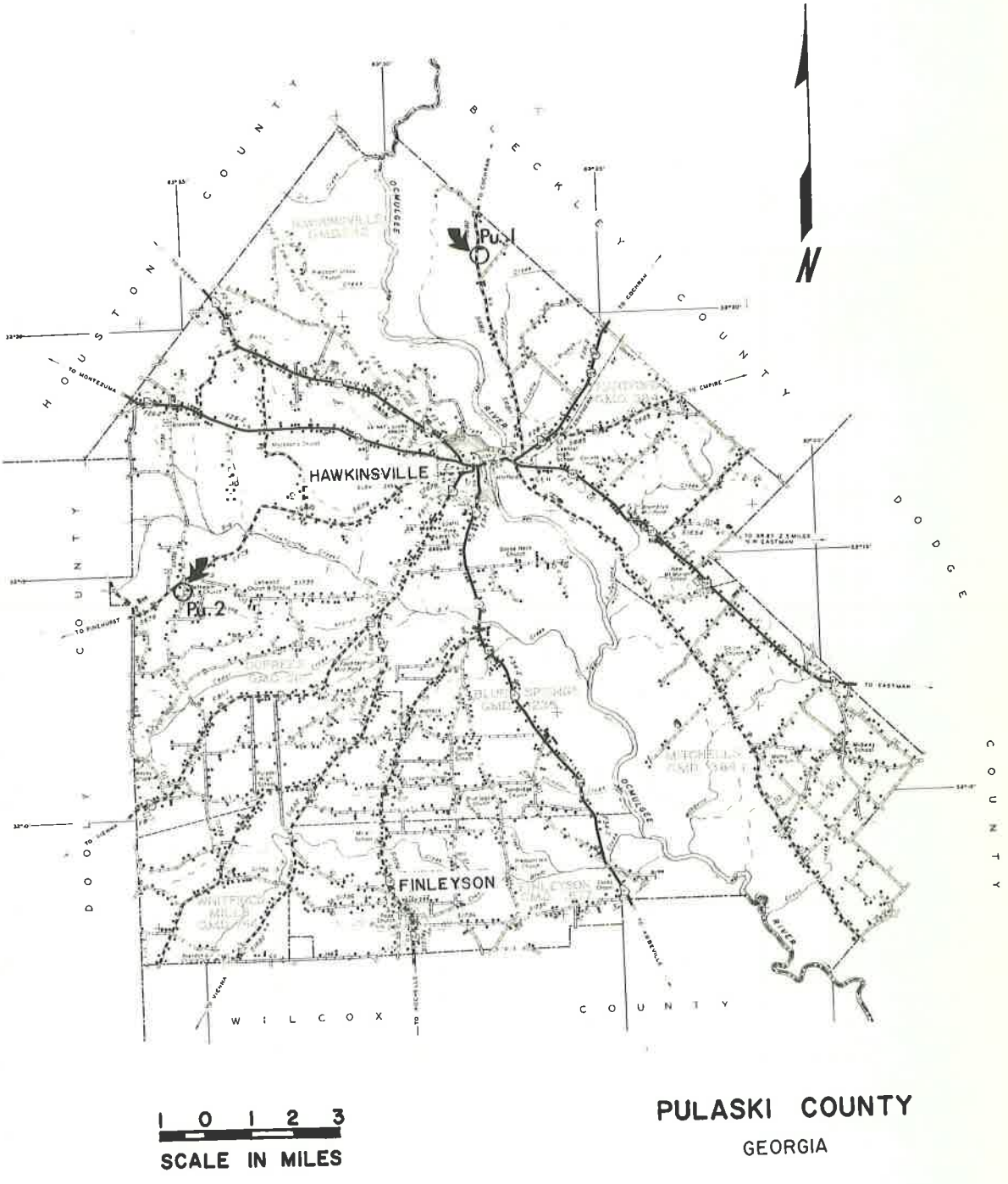


Figure PU-1. Location of Holes - Pulaski County

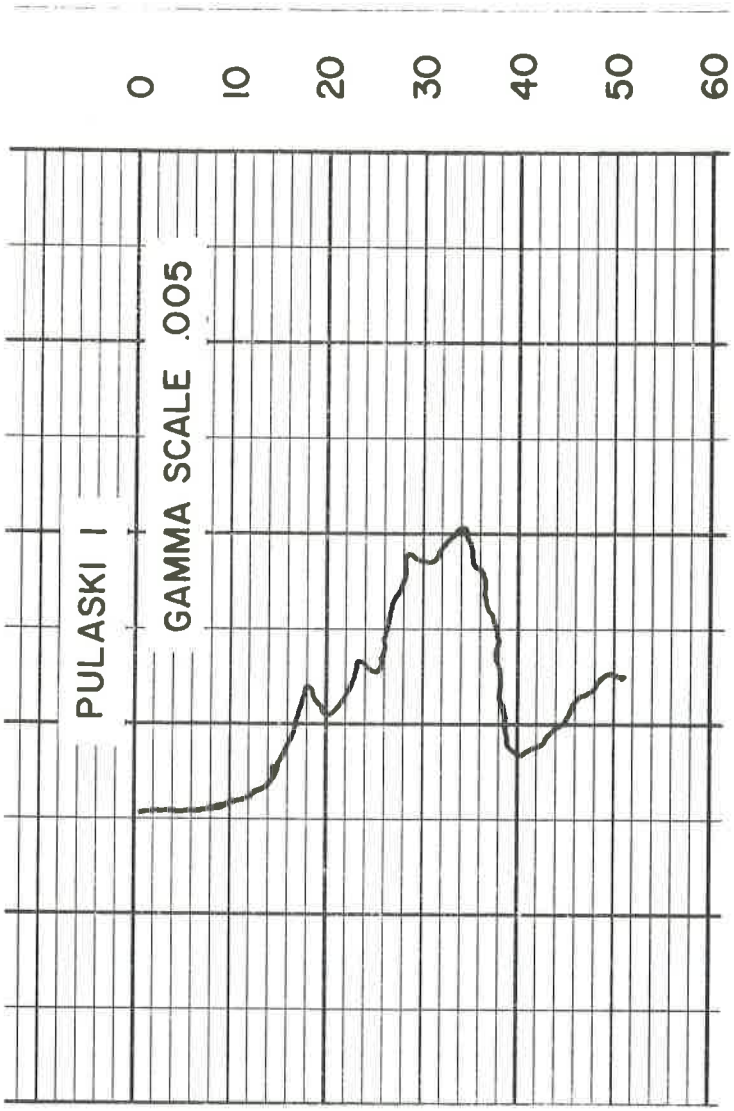


Figure PU-2. Gamma-Ray Logs - Pulaski County
Hole Pu-1

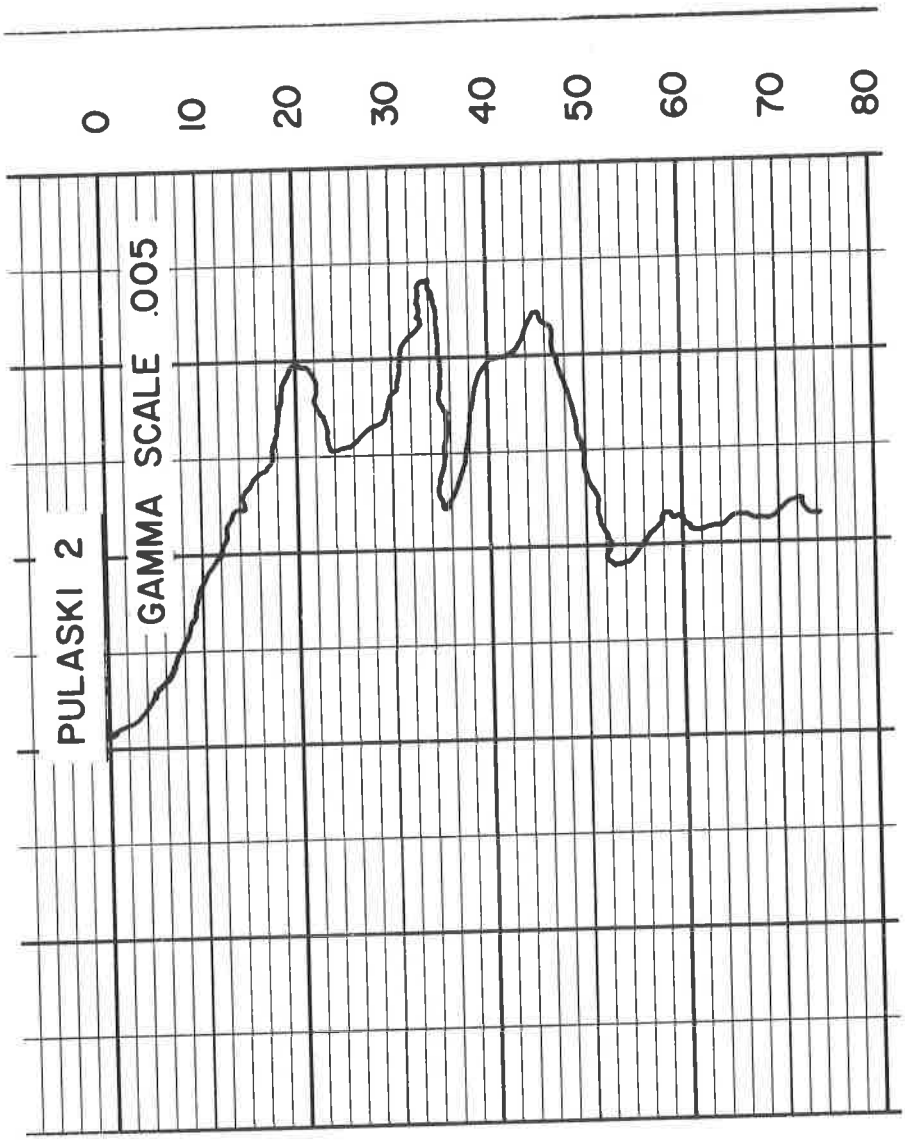


Figure PU-2. Gamma-Ray Logs - Pulaski County
Hole Pu-2

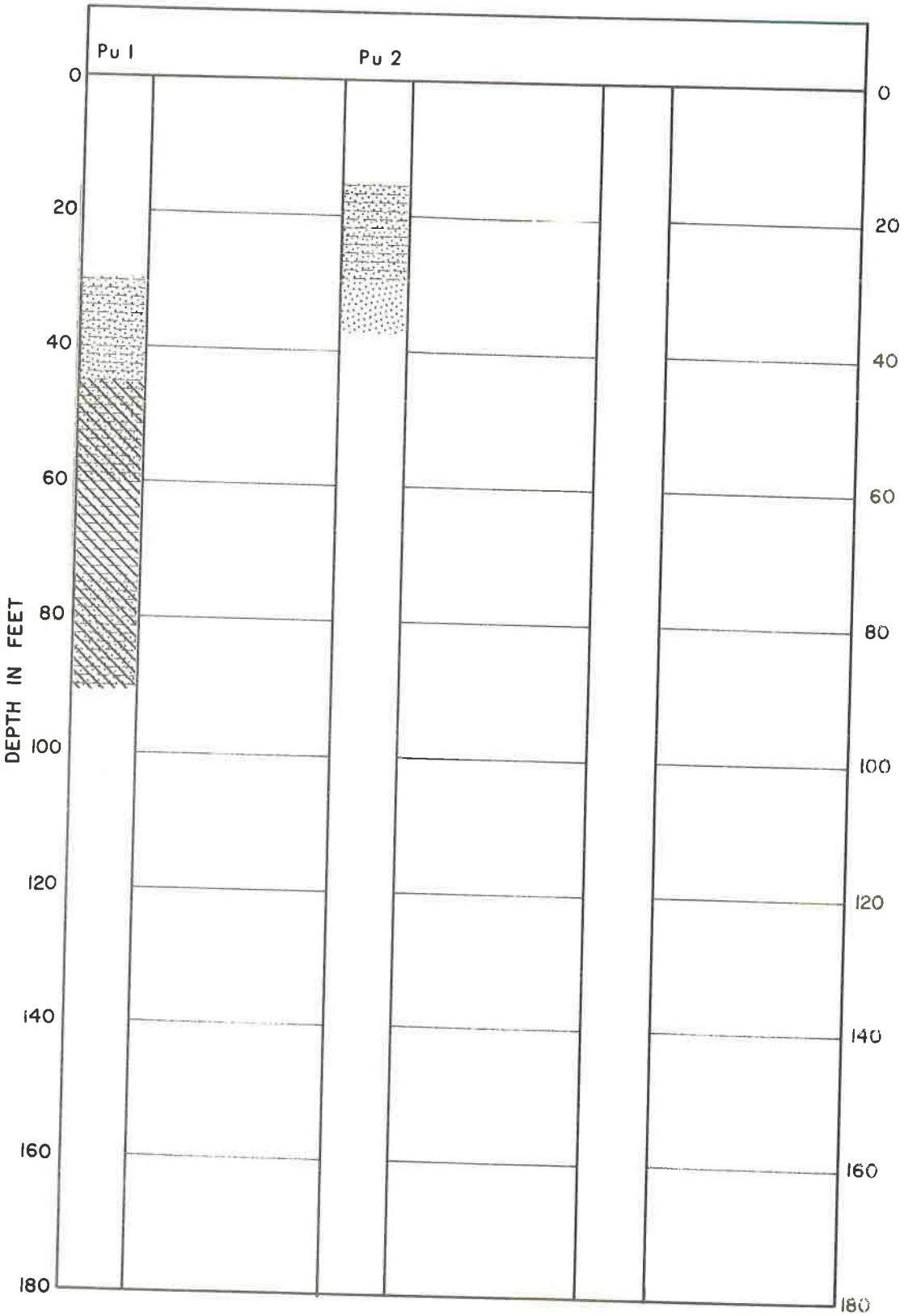


Figure Pu-3. Lithologic Logs - Pulaski County

TABLE PU-I

BPL DETERMINATION ON CORES

Pulaski County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Pu-1	299	0-30	-	-	-
		30-45	1	7	0
		45-60	11	73	.81
		60-75	14	93	.44
		75-90	4	27	.71
Pu-2	321	0-5	Wash Sample	-	
		5-10	Wash Sample	-	
		10-15	Wash Sample	-	
		15-30	8	53	0
		30-37	1	14	0
		37-40	Wash Sample	-	0
		40-45	Wash Sample	-	0
		45-50	Wash Sample	-	0
		50-55	Wash Sample	-	0
		55-60	Wash Sample	-	0
		60-65	Wash Sample	-	0
		65-70	Wash Sample	-	0
		70-75	Wash Sample	-	

THOMAS COUNTY

THOMAS COUNTY

SUMMARY OF RESULTS

Thomas County holes 2 and 3 are reported herein. Only Th-3 had matrix of sufficient interest to be beneficiated and the results indicate a sub-marginal deposit.

Electrical logs were not run on Th-3 because of caving hole conditions. The gamma-ray logs was run inside the drill pipe.

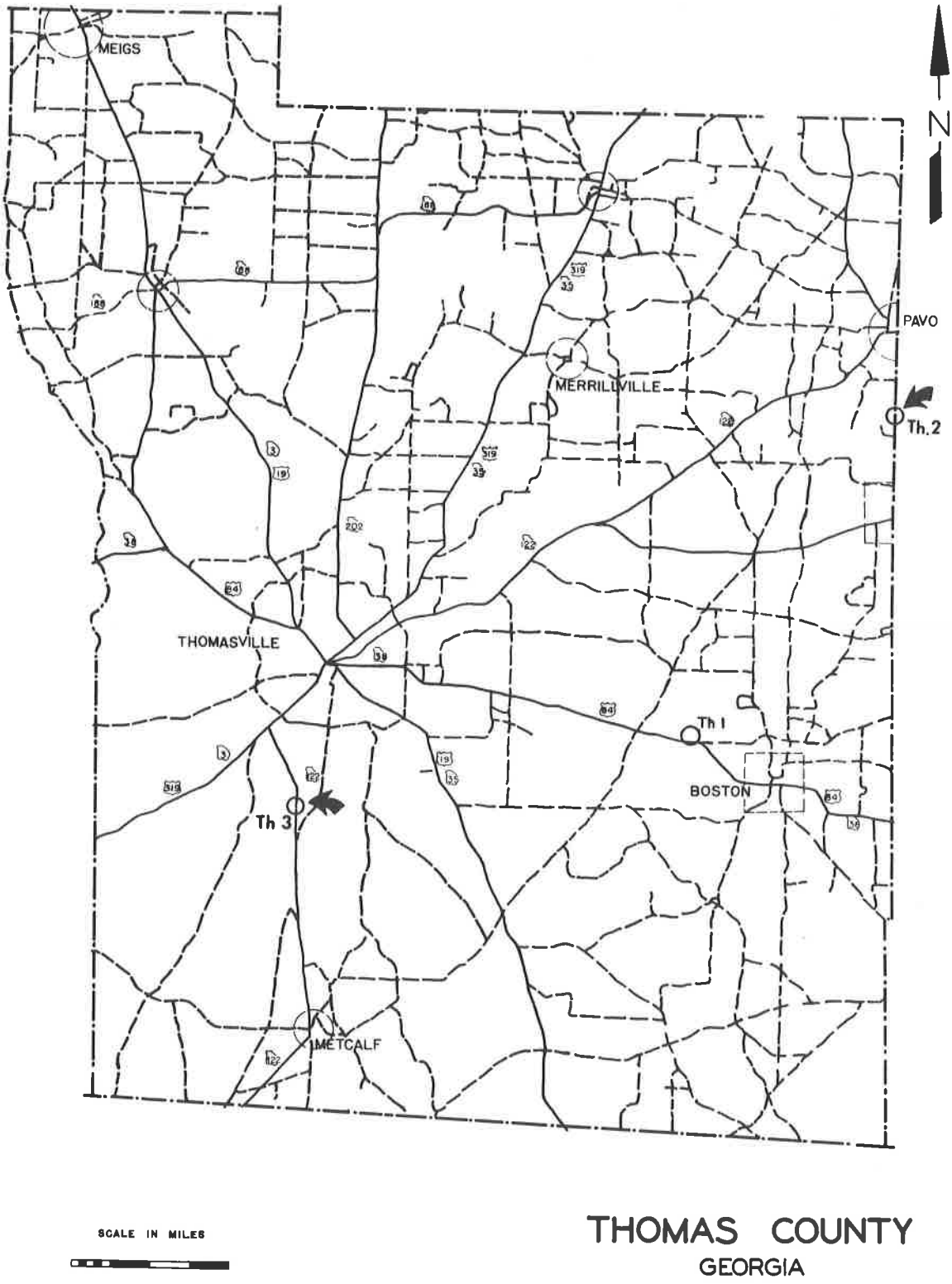


Figure TH-1. Location of Holes - Thomas County

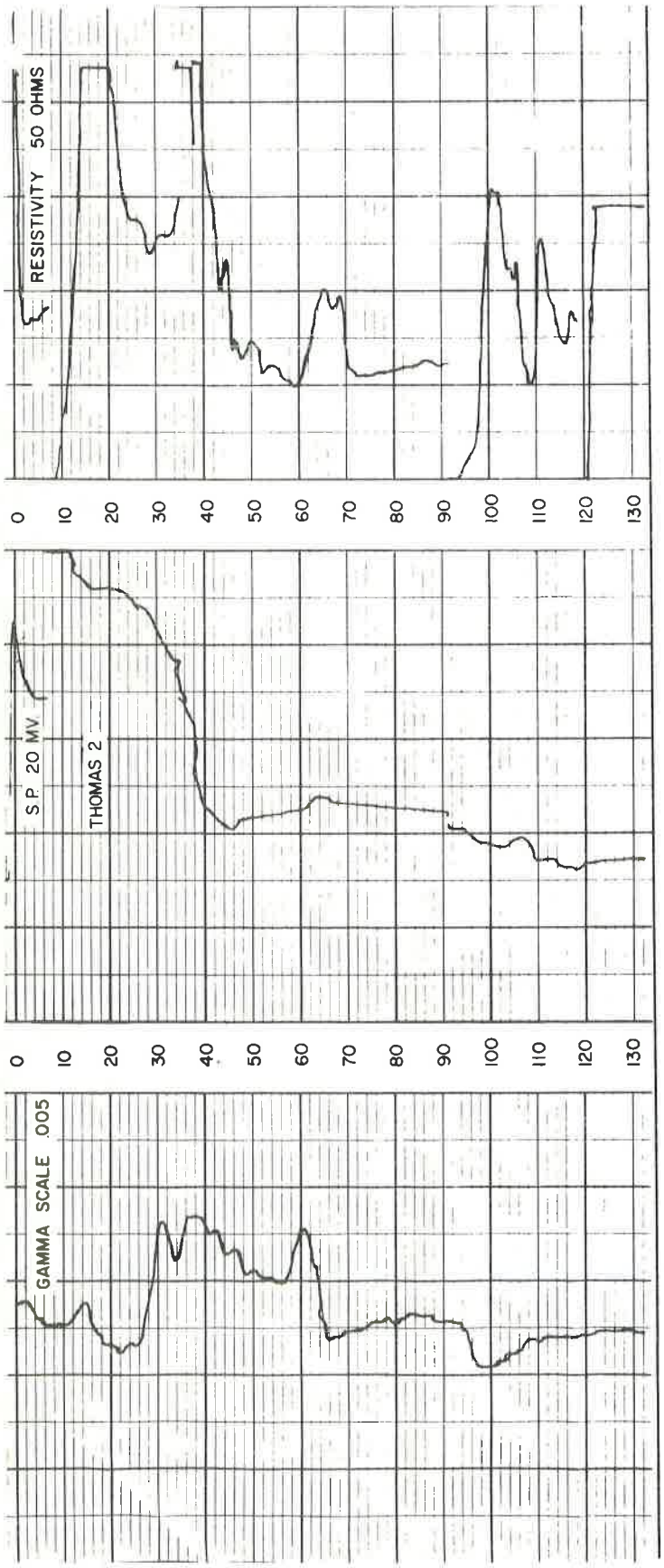


Figure TH-2. Electric and Gamma-Ray Logs - Thomas County
Hole Th-2

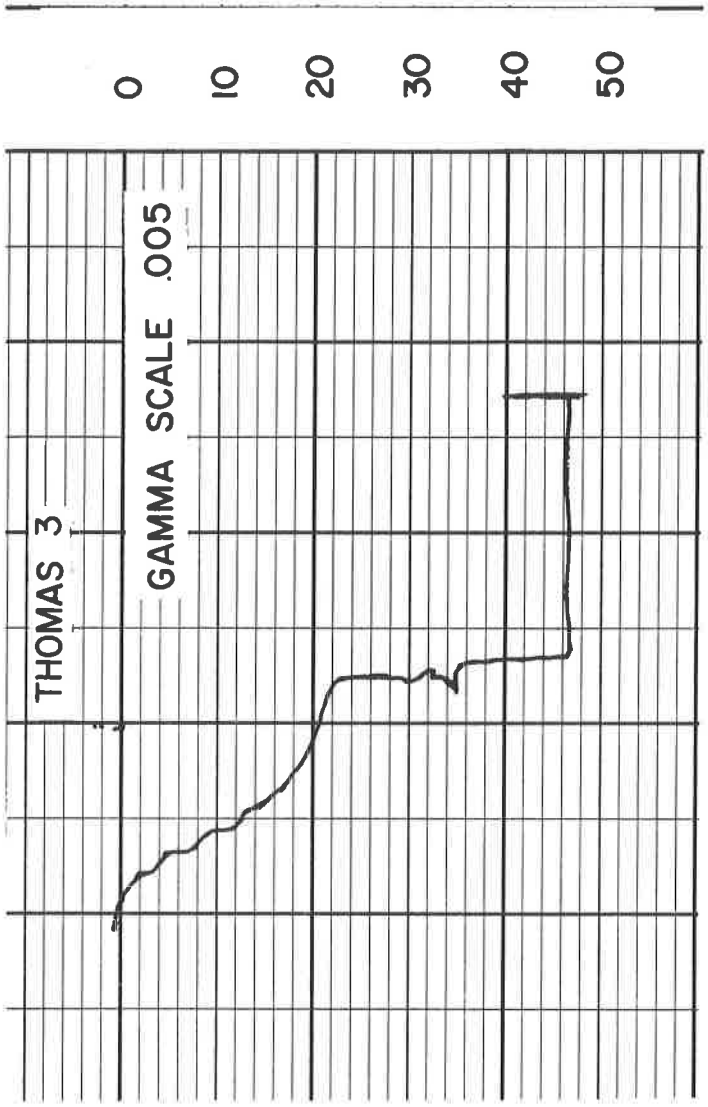


Figure TH-2. Gamma-Ray Logs - Thomas County
Hole Th-3

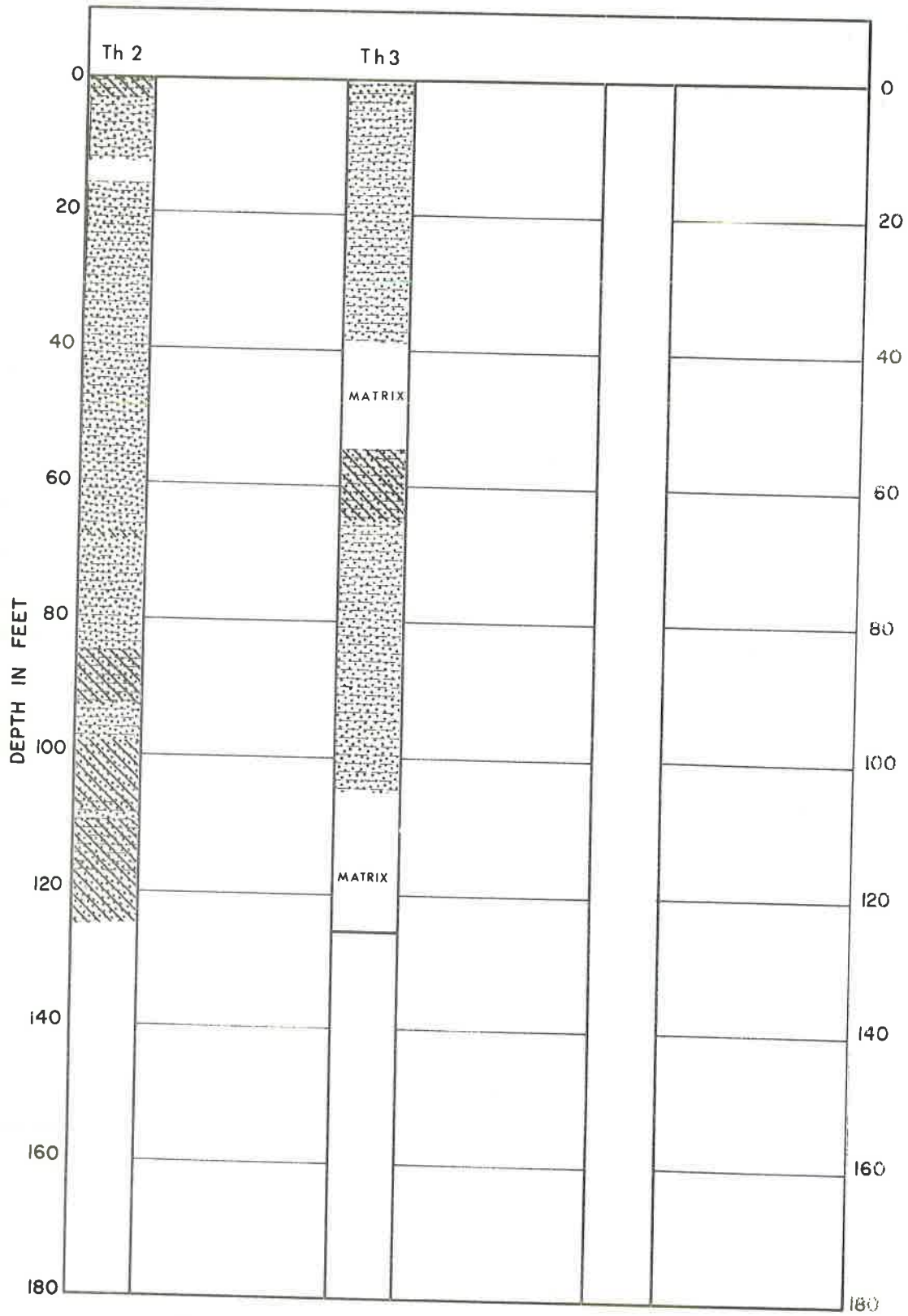


Figure Th-3. Lithologic Logs - Thomas County

TABLE TH-I

BPL DETERMINATION ON CORES

Thomas County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Th-2	239	0-3	2	67	0
		3-6	3	100	0
		6-9	3	100	0
		9-12	3	100	0
		12-15	0	0	-
		15-30	3	20	0
		30-45	2	14	0
		45-55	10	100	1.45
		55-66	11	100	8.06
		66-77	10	92	0.57
		77-83	6	100	0
		83-91	8	100	2.76
		91-98	7	100	1.96
		98-106	1	12	0
		106-109	3	100	0.44
		109-110	0	0	-
		110-118	4	50	0
		118-125	3	43	0
Th-3	194	0-3	2	67	0
		3-6	2	67	0
		6-9	3	100	0
		9-23	6	43	0
		23-33	9	90	0
		33-39	6	100	0
		39-49	9	90	13.15
		49-54	5	100	10.52
		54-65	8	42	3.24
		65-74	9	100	1.72
		74-82	8	100	2.56
		82-90	8	100	9.24
		90-105	9	60	4.99
		105-115	10	100	9.98
		115-125	9	90	10.25

TABLE TH-II

MATRIX BENEFICIATION RESULTS

THOMAS COUNTY

HOLE NO. TH-03 MATRIX INTERVAL = 39-54

	FEED 15	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE											
DRY DENSITY LB/CU FT	43.65										
PERCENT DRY WEIGHT	100.0	.27	.46	1.34	57.34	2.03	55.31	40.58	10.21	86.13	3.66
PERCENT BPL	11.53	3.03	10.95	13.99	10.11	29.84	10.29	13.52	50.41	2.87	31.53
PERCENT ACID INSOL	79.93	87.20	73.89	71.49	84.08	52.66	85.68	74.36	35.53	96.58	58.88
PERCENT IRON OXIDE	1.57	.79	.36	.41	.48	1.61	.46	3.17	.44	.09	2.22
PERCENT ALUM OXIDE	4.22	1.32	4.30	7.56	2.46	4.72	2.41	6.62	1.44	2.46	6.61
PERCENT CALC OXIDE	5.95	2.24	5.60	7.70	5.25	19.94	4.55	6.91	31.83	.62	20.99

NOTE: FLOTATION FEED HAD TO BE SCRUBBED, DESLIMED, AND RE-SCRUBBED FOR FLOTATION TO BE SUCCESSFUL.

TABLE TH-II (CONT.)

MATRIX BENEFICIATION RESULTS

THOMAS COUNTY

HOLE NO. TH-03 MATRIX INTERVAL = 105-125

	FEED 20	+4	4X8	8X16	F F 16X150	(16X35	35X150)	SLIME -150	(CONC	F.A. TAILS	AMINE FLOAT)
TOTAL MATRIX FOOTAGE											
DRY DENSITY LB/CU FT											
PERCENT DRY WEIGHT	100.0	3.98	1.88	1.65	47.25						
PERCENT BPL	11.60	2.87	7.92	11.46	4.22						
PERCENT ACID INSOL	80.64	92.34	85.13	82.15	94.07						
PERCENT IRON OXIDE											
PERCENT ALUM OXIDE											
PERCENT CALC OXIDE											

NOTE: WORK ON THE MATRIX WAS DISCONTINUED AFTER THE FLOTATION FEED WAS FOUND TO CONTAIN LESS THAN 7% BPL.

TABLE TH-III

ECONOMIC FACTORS - FIGURES OF MERIT

INDIVIDUAL MATRICES — WELL NO. TH-03

MATRIX NO.		1
DEPTH INTERVAL, FT.		39- 54
ECONOMIC FACTORS *	UNIT (M=1000)	
* OVERBURDEN	FT.	39.00
	MT/AC	76.4
* MATRIX	FT.	15.00
	MT/AC	14.3
* BPL IN MATRIX	PERCENT	11.53
	MT/AC	1.6
* OVERBURDEN/MATRIX	RATIO	2.60
WASH-SCREEN PRODUCTS		
+16 MESH	MT/AC	.3
-16+150 MESH	MT/AC	8.2
-150 MESH (LOSS)	MT/AC	5.8
* FLOTATION CONCENTRATE PRODUCT	MT/AC	.8
TOTAL USEFUL PRODUCTS**	MT/AC	1.1
BPL RECOVERY		
+16 MESH	MT/AC	.0
* -16+150 (FLOT. CONC.)	PERCENT BPL	50.4
* -16+150 (FLOT. CONC.)	MT/AC	.4
* TOTAL	MT/AC	.5
* RECOVERED FROM MATRIX	PERCENT	27.73
* OVERBURDEN / PRODUCT	CU YD/T	114.8
* MATRIX / PRODUCTS	CU YD/T	21.41
* I+A IN FLOT. CONC.	PERCENT	1.88

FIGURES OF MERIT	UNIT	ECON. LEVEL	
OVERBURDEN	FT	88 MAX	2.26
MATRIX	FT	3 MIN	5.00
MATRIX BPL	PERCENT	10 MIN	1.15
BPL IN FLOT. CONC.(1)	PERCENT	66 MIN	.76
BPL IN FLOT. CONC.(2)	PERCENT	66 MIN	.97
OVERBURDEN/MATRIX	RATIO	2 MAX	.77
OVERBURDEN/PRODUCTS	CU YD/T	17.5 MAX	.15
I+A IN FLOT. CONC.	PERCENT	5 MAX	2.66
PRODUCTS RECOVERY	T/AC-FT	400 MIN	.19
BPL (+150) RECOVERY	PERCENT	63 MIN	.44
MATRIX/PRODUCTS	CU YD/T	6 MAX	.28

(1)FOR WET ACID PROCESS, (2)FOR ELECTRIC FURNACE PROCESS, (**)SUM OF +16 MESH AND FLOT. CONC.
NOTES. OVERBURDEN WEIGHT BASED ON 90 LB/CU FT. MATRIX WEIGHT BASED ON ACTUAL DRY DENSITY

TWIGGS COUNTY

TWIGGS COUNTY

SUMMARY OF RESULTS

The Twiggs County hole was drilled on the basis of reported phosphorite in GGS Well No. 416. Although phosphorite was found almost continuously in both Upper Eocene and Upper Cretaceous, the quantity is slight.

Electric and gamma-ray logs were not run on these holes because of caving hole conditions. The holes were drilled with Failing 250 rig and pipe inside diameter was not large enough for the gamma-ray probe.

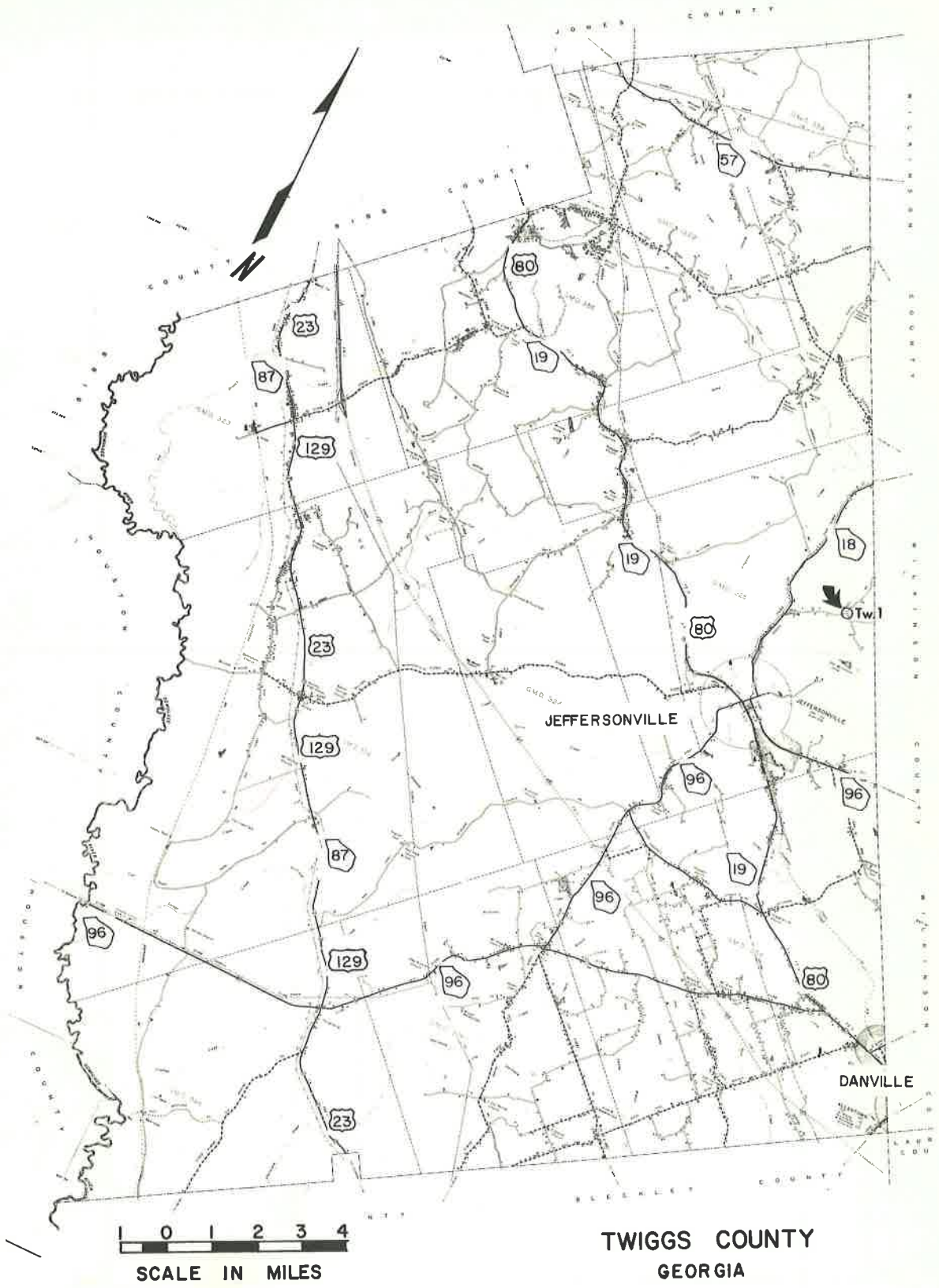


Figure TW-1. Location of Holes - Twiggs County

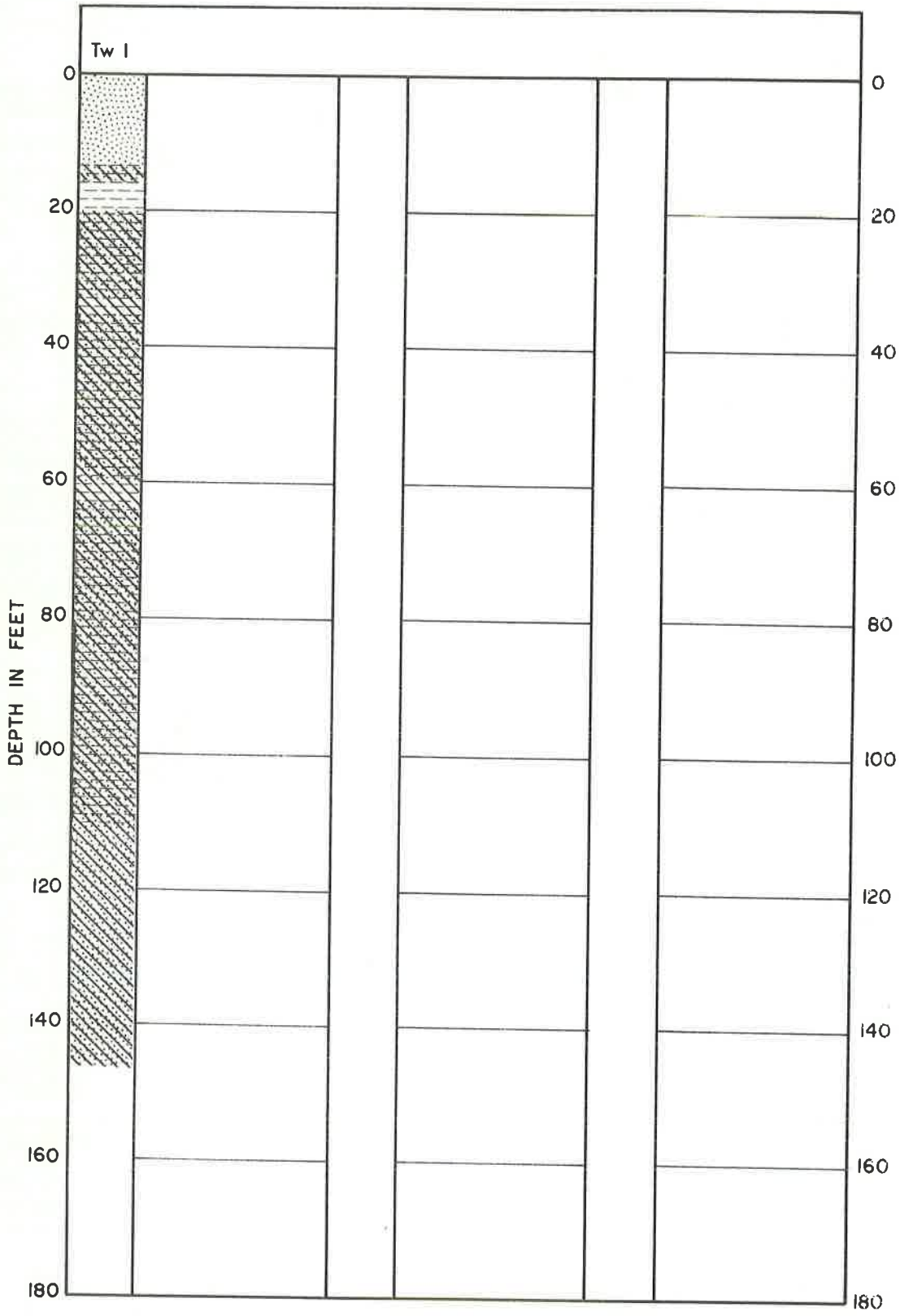


Figure Tw-3. Lithologic Logs - Twiggs County

TABLE TW-I

BPL DETERMINATION ON CORES

Twiggs County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Tw-1	502	0-4	3	75	0
		4-7	3	100	0
		7-9	2	100	0
		9-11	2	100	0
		11-13	2	100	0
		13-15	2	100	0
		15-20	5	100	1.01
		20-25	5	100	0.71
		25-30	5	100	1.25
		30-32	2	100	0.54
		32-34	2	100	0.50
		34-39	5	100	0.30
		39-40	1	100	0.13
		40-46	6	100	0
		46-49	2	67	0.27
		49-59	8	80	0.41
		59-62	2	67	0.91
		62-68	4	67	0.37
		68-69	1	100	0.34
		69-75	5	83	0.40
		75-80	5	100	0.44
		80-84	3	75	0.50
		84-86	2	100	0.54
		86-90	4	100	0.47
		90-92	2	100	0
		92-96	3	75	0.54
		96-102	5	83	0.44
		102-109	5	71	0.30
		109-112	-	-	-
		112-117	4	80	0.34
		117-120	1	33	0
		120-131	3	27	0
		131-140	4	44	0.30
		140-145	2	40	0

WILKINSON COUNTY

WILKINSON COUNTY

SUMMARY OF RESULTS

The Wilkinson Hole was drilled because of reported phosphorite in GGS Hole No. 529. It did not go as deep as the Middle Eocene sediments where the phosphorite was reported, but did sample the current economic mining depth. Small amounts of phosphorite were found between 16 and 57 feet of depth.

Electrical and gamma-ray logs were not run on this hole because of caving conditions and the use of the smaller rig.

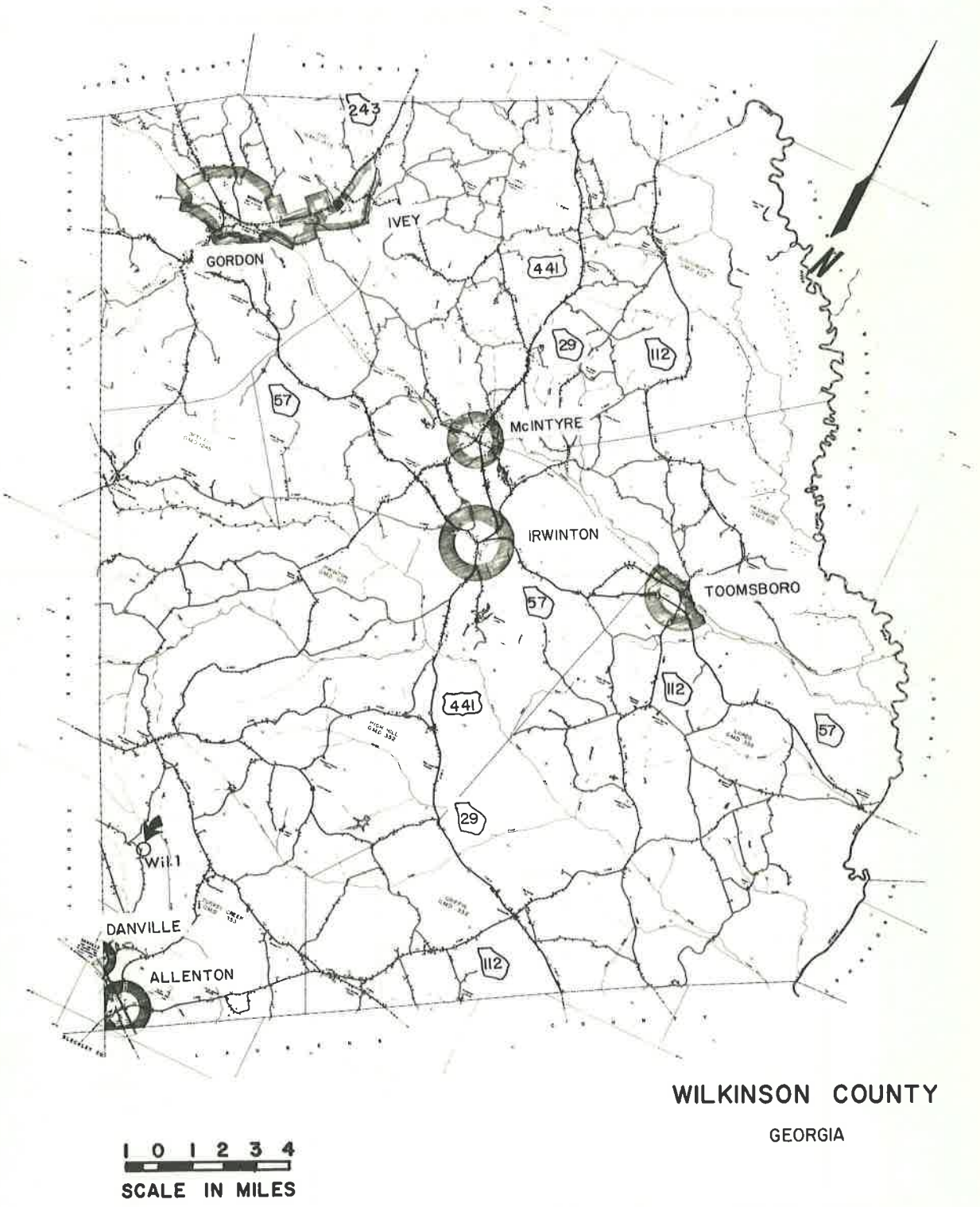


Figure WILK-1. Location of Holes - Wilkinson County

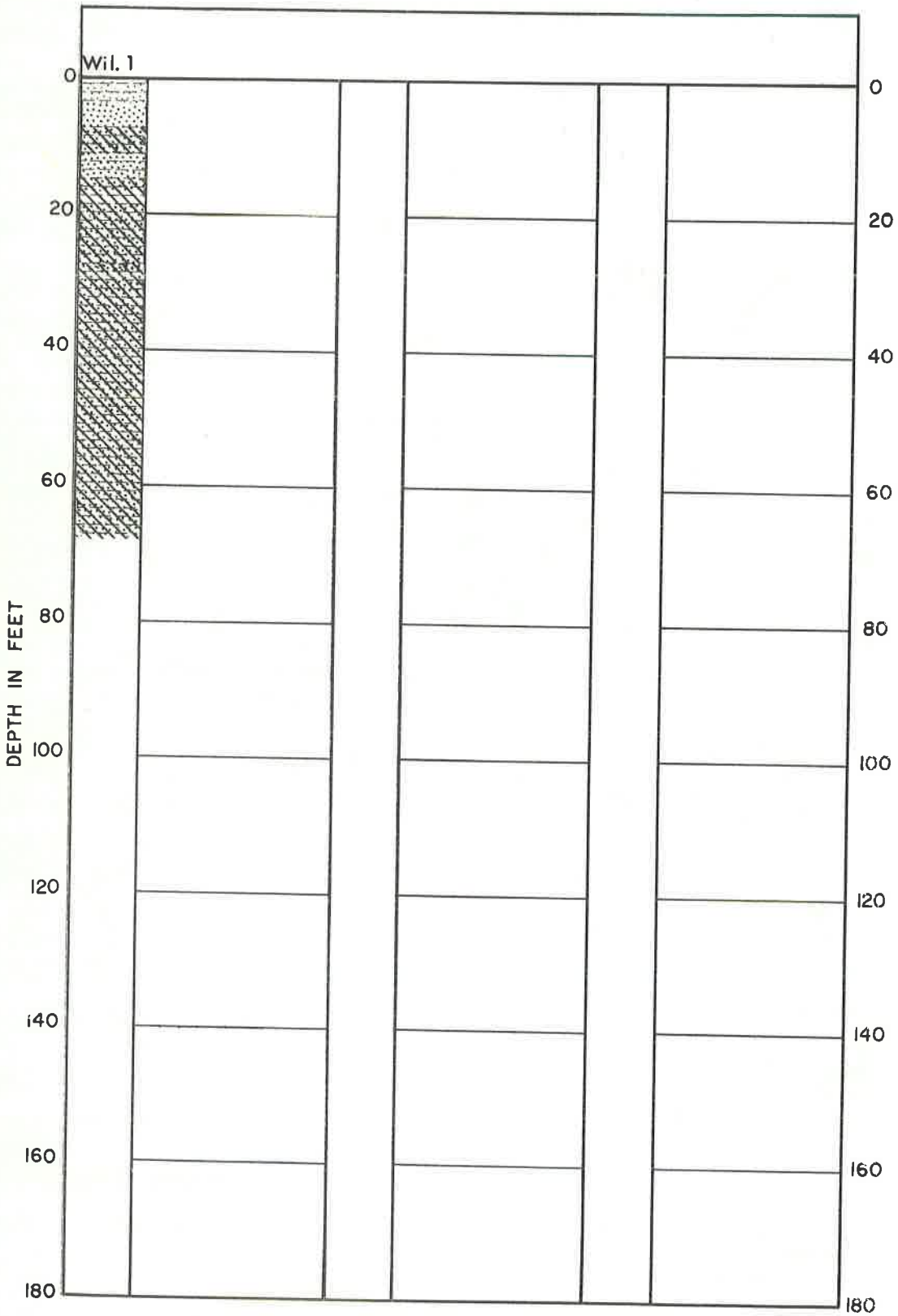


Figure Wil-3. Lithologic Logs - Wilkinson County

TABLE WILK-I

BPL DETERMINATION ON CORES

Wilkinson County

Hole No.	Surface Elevation (Sea Level) Feet	Depth, Feet	Core Recovery Feet	Core Recovery %	BPL %
Wilk-1	333	0-1	-	-	-
		1-3	1	50	0
		3-6	2	67	0.20
		6-9	2	67	0
		9-13	3	75	0
		13-16	2	67	0
		16-23	7	100	0.13
		23-28	4	80	0.24
		28-37	7	78	0.10
		37-47	7	70	0.27
		47-57	8	80	0.07
		57-67	4	40	0
		67-100	-	-	-
		100-105	Wash Sample	-	0
		105-110	Wash Sample	-	0
		110-115	Wash Sample	-	0
		115-120	Wash Sample	-	0
		120-125	Wash Sample	-	0
		125-130	Wash Sample	-	0
		130-135	Wash Sample	-	0
		135-140	Wash Sample	-	0
		140-145	Wash Sample	-	0
		145-150	Wash Sample	-	0

APPENDIX

APPENDIX

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County	Holes	Report Number	Location of Holes	Gamma and Electric Log	Lithologic Logs	Particle Size	Visual and Microscopic Observation	Physical Properties	BPL Determination	Matrix Beneficiation	Economic Factors	Chemical Composition	Mineral Percent	Chemical Analysis of Heavy Minerals	X-Ray Diffraction	
Appling	A 34-35	8	7					27						39		
Atkinson	1-3	5	21	23	22				25	26						
Atkinson	1-3	6				39	42					53				
Atkinson	A 53	8	9					28					32	39		
Bacon	A 48-50	8	8					28					32	39		
Ben Hill	1-3	5	28	30	29				32							
Ben Hill	1-3	6				39	43					53				
Berrien	1-3	5	34	36	35				38	39						
Berrien	1-3	6				39	44					53				
Brantley	A 56-65	8	9					28					33	39		
Brooks	1-2	3	17		18				19							
Brooks	1-2	6		57,58												
Bryan	A 10-18	8	5					24					31	38		
Bryan	1-2	10	7		8	12	13		9			11				
Bulloch	A 1-3	8	5					24					31	38		
Camden	1-2	3	21		22				23							
Camden	1-2	6							59,60							
Camden	A 77-80	8	11					30					34	40		
Charlton	A 73-76	8	11					30					33	40		

APPENDIX (Continued)

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APRIL, 1969

County	Holes	Report Number	Location of Holes	Gamma and Electric Logs	Lithologic Logs	Particle Size	Visual and Microscopic Observation	Physical Properties	BPL Determination	Matrix Beneficiation	Economic Factors	Chemical Composition	Mineral Percent	Chemical Analysis of Heavy Minerals	X-Ray Diffraction	
Charlton		4	5													
Chatham	A 19-22	8	6					25					31	38		
Chatham	1-5	9	14	17	15				23	26	37					
Chatham	6-9	10	18	21	19	28	29		24	35	36	27			33	
Clinch	1-3	3	25		26				27							
Clinch		4	S													
Clinch	1-3	6		61-63												
Clinch	A 72	8	11					30					33	40		
Coffee	1-2	5	42		43				44							
Cook	1-5	5	46	48	47				50							
Echols	1-14	2	5,22		31				25	64			36			
Echols		4	S													
Echols	1-11 13-14	6		64-77												
Echols	15-17	9	48	50	49				53	55	57					
Effingham	1	3	31		32				33							
Effingham	2-7	6	8	11	9	40	45		18			54				
Effingham	4-7	8	5			50-58		24					31	38		
Effingham	8	10	39	41	40	45	46		42			44			48	
Evans	9	8	5					24					31	38		

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APRIL, 1969

County	Holes	Report Number	Location of Holes	Gamma and Electric Logs	Lithologic Logs	Particle Size	Visual and Microscopic Observation	Physical Properties	BPL Determination	Matrix Beneficiation	Economic Factors	Chemical Composition	Mineral Percent	Chemical Analysis of Heavy Minerals	X-Ray Diffraction	
Glynn	A 66-70	8	10					29					33	40		
Irwin	1-3	5	53	55	54				58							
Irwin	1-3	6				41	49					55				
Jeff Davis	A 33	8	7					26					32	39		
Jeff Davis	1-3	9	77	79	78				85							
Lanier	1-7	3	35		36				38							
Lanier	2,4,6,7	6		78-81									33			
Lanier	A 71	8	11					30						40		
Lanier	8	9	59	61	60				62	63	64		32			
Liberty	A 27-32	8	7					26						39		
Liberty	1	9	87	89	88				95							
Long	A 23-26	8	6					26					32	39		
Long	1,2	9	90	92	91				95							
Lowndes	1-7	3	49		50				52							
Lowndes	4	8														
Lowndes	1-7	6		82-88												
Lowndes	4	6				41	51					55				
Lowndes	8-9	9	65	67	66				69	71	74					
McIntosh	A 42-47	8	8					27					32	36		

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APRIL, 1969

County	Holes	Report Number	Location of Holes	Gamma and Electric Logs	Lithologic Logs	Particle Size	Visual and Microscopic Observation	Physical Properties	BPL Determination	Matrix Beneficiation	Economic Factors	Chemical Composition	Mineral Percent	Chemical Analysis of Heavy Minerals	X-Ray Diffraction	
Montgomery	1		9	81						85						
Pierce	A 51-52	8	9					28					32	39		
Screven	1-5	10	51	54	52	64	66		58			63			72	
Tattnall	A 8	8	5					24					31	38		
Thomas	1	3	60		61				62							
Ware	1	3	65		66				67							
Ware	A 54-55	8	9					28					33	39		
Wayne	A 36-41	8	8					27					32	39		
Wayne	1	9	93		94				95							
Wheeler	1	9	82	84	83				85							

Note: A = Auger Hole
S = Southern Railroad Holes