

(SEE GENERAL FILE "GEOHERMAL VPI/DOE"
FOR FULL REFERENCE)

N.C.

III. STATE FUEL PRODUCTION (1973) (C-6)

Type	Number	Units	Trillion Btu
Coal mines	0	0 thousand tons	0
Natural gas (liq.)	0	0 thousand bbl	0
Natural gas wells	0	0 million cu. ft.	0
Crude oil wells	0	0 thousand bbl	0

IV. GEOLOGY

The surface of the basement complex to the north of Wilmington dips to the southeast attaining a maximum onshore depth of approximately 10,000 ft. in the vicinity of Cape Hatteras. Coastal plain sediments, which range in age from Cretaceous to Recent, form a southeasterly thickening wedge that overlies the Precretaceous basement complex. An onshore positive basement structure, trending northwest-southeast, is the dominant structural feature south of Wilmington. This feature, the Cape Fear Arch, is covered by a thin (about 1500 ft.) veneer of sedimentary rocks.

V. RESOURCE DATA

The DOE/DGE sponsored geothermal drilling program drilled eleven 1000 ft. gradient holes in the North Carolina coastal plain. The geothermal gradients varied from 22°C/km to 41°C/km (1.2°F/100 ft. to 2.2°F/100 ft.). Since the depth to basement is 2000 to 3000 ft. over much of the coastal plain, estimates of temperatures at basement are modest, i.e., 30°C to 44°C (86 to 112°F). However for several holes on the mainland, to the west of Cape Hatteras, and where the depth to basement is 4000 to 5000 ft., temperatures at basement are estimated to be as high as 85°C (185°F) (3).

VI. GEOHERMAL ACTIVITIES

The geothermal gradient test holes sponsored by the DOE/DGE drilling program have been completed and the results have been assessed by VPI&SU. APL/JHU has conducted and published a study of the energy markets in the northern coastal region of the state (6). APL has forwarded information to a utility (Carolina Power and Light) on the nature and prospects for geothermal energy.

VII. LEGAL ACTIVITIES

NCSL may conduct a workshop for state legislature to consider geothermal legislation.

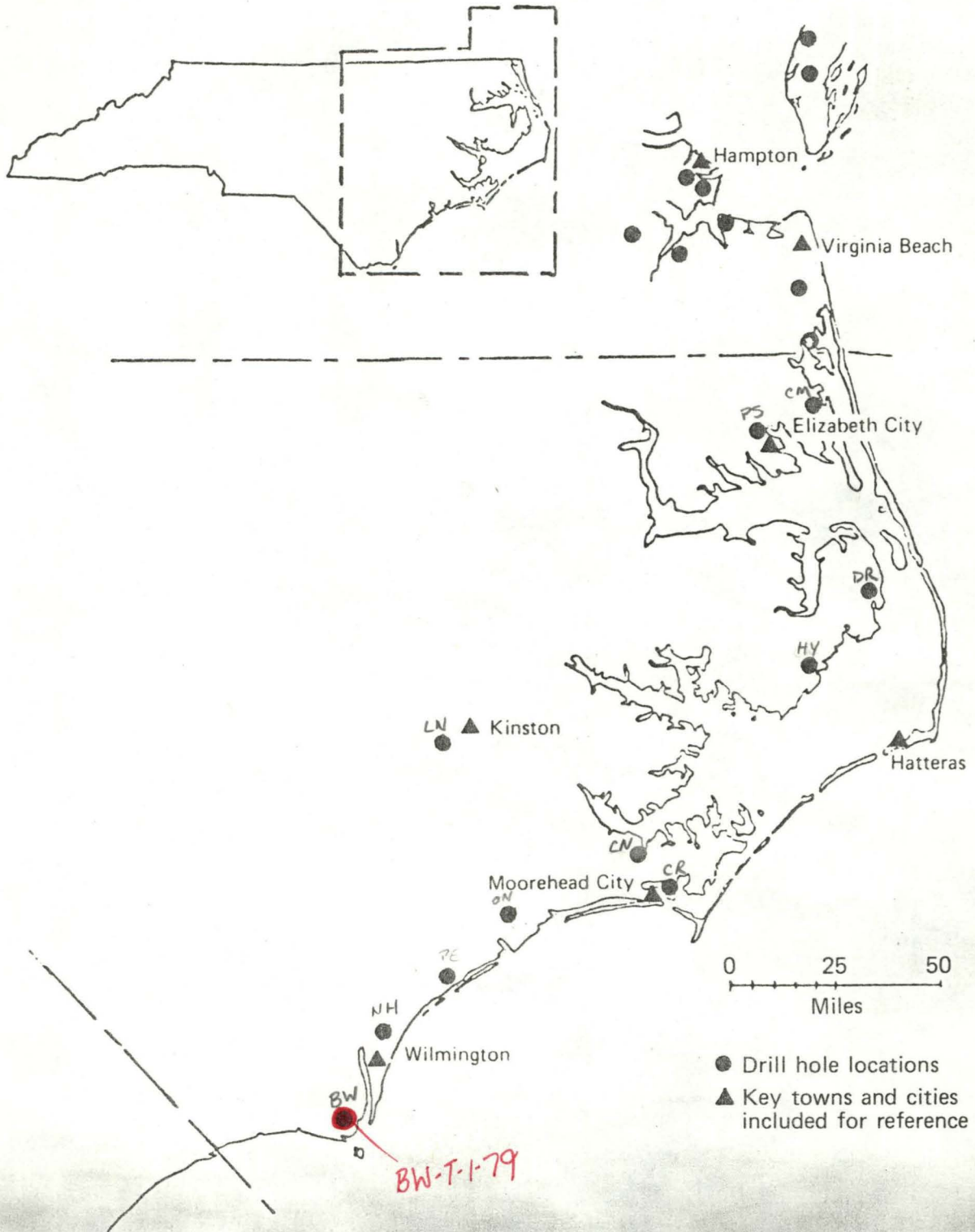
10. Environmental Impact Assessments, Division of Budget Management, 116 W. Jones St., Raleigh, NC 27603, Crys Baggett, Clearinghouse Supervisor, (919) 733-7061.
11. State Coupled Reservoir Assessment Program, VPI&SU, Blacksburg, VA 24061, Prof. John Costain, Geothermal Program, (703) 961-5096.

REFERENCES AND LIST OF SIGNIFICANT REPORTS

- (1) P. M. Brown, J. A. Miller, and F. M. Swain, "Structural and Stratigraphic Framework and Spatial Distribution of Permeability of the Atlantic Coastal Plain, North Carolina to New York," U.S.G.S. Professional Paper 796, 1972.
- (2) "Evaluation and Targeting of Geothermal Energy Resources in the Southeastern United States, Progress Report Oct 1, 1978 - March 30, 1979," VPI&SU, Blacksburg, VA, DOE Report VPI-SU-5648-5.
- (3) "Geothermal Resources of the Eastern United States," Gruy Federal, Inc., Arlington, VA, DOE Report DOE/ET/28373-T2.
- (4) "Geothermal Energy Market Study in the Atlantic Coastal Plain, Definitions of Markets for Geothermal Energy in the Northern Atlantic Coastal Plain," APL/JHU GEM-002 (QM-80-075), May 1980.

COMMON REFERENCES

(C-1), (C-4), (C-5), (C-6), and (C-7).



Locations of gradient test holes — Eastern North Carolina.

TABLE C-3.1

HOLE	LATITUDE	LONGITUDE	INTERVAL (M)	GRADIENT SIGMA (REGR, N) (°C/KM)	COND SIGMA (N)	HEAT FLOW	ESTIMATED BASEMENT SURFACE DEPTH TEMPERATURE (KM) (°C)
BW-T-1-79							
SOUTHPORT, N.C. C14A	33	58.00 77 58.20	60-463	32 *			.465 32
WILMINGTON, N.C. C14	34	12.00 77 53.40	45-380	29 *			.385 28
SNEADS FERRY, N.C. C15A	34	31.60 77 27.30	30-475	31 *			.495 31
JACKSONVILLE, N.C. C15	34	39.00 77 19.00	50-500	30 *			.505 31
KINSTON, N.C. C16A	35	15.70 77 35.30	69-217	23 *			.210 21
CHERRY POINT, N.C. C16	34	54.70 76 53.30	80-308	22 *			.84 36
BEAUFORT, N.C. C17	34	46.30 76 38.70	45-302	25 *			1.36 51
ENGLEHARD, N.C. C18	35	31.20 75 59.26	49-304	36 *			1.84 81
STUMPY POINT, N.C. C19	35	45.12 75 47.65	53-269	40 *		1.94	1.78 85
			187.1-221.7	57.05±0.77(0.988, 68)1	3.3±0.18(14)	1.9±0.1	
			196.7-205.8	60.01±6.71(0.842, 17)2	3.3±0.18(14)	2.0±0.3	
			248.1-296.3	54.14±1.38(0.966, 56)3	3.9±0.91(15)	2.1±0.6	
ELIZABETH CITY, N.C. C20	36	16.81 76 12.58	50-313	31 *			.95 44
BELLCROSS, N.C. C21	36	19.59 76 03.54	23-308	33 *			1.22 55
CREEDS, VA. C22	36	36.38 76 00.43	89-307	34 *			1.08 50
OCEANA, VA. C23	36	48.09 76 02.62	75-296	38 *			.94 49
NORFOLK, VA. C24	36	57.40 76 16.20	17-316	37 *		1.34	
			152.4-173.3	44.14±0.57(0.994, 41)2	3.4±0.45(25)	1.5±0.2	
			161.7-174.3	49.00±1.64(0.975, 25)2	3.4±0.45(25)	1.7±0.3	
			252.8-316.7	24.75±0.04(1.000, 124)1	3.7±0.96(12)	0.9±0.2	
			303.2-308.5	29.13±2.17(0.957, 10)2	3.7±0.96(12)	1.1±0.4	
SUFFOLK, VA. C25	36	51.01 76 28.83	21-307	43 *		1.44	.557 39
			295.8-309.9	26.85±0.39(0.996, 23)1	5.0±1.04(24)	1.4±0.3	

C-30

COSTAIN, J.K., GLOVER, L. III, and SINHA, A.K., 1979;

FROM: EVALUATION AND TARGETING OF GEOTHERMAL ENERGY RESOURCES IN THE SOUTHEASTERN UNITED STATES.

VPI #SU-5648-5

PROGRESS REPORT
10/1/78 - 3/30/79

GEOHERMAL HOLES

VPI / DOE

ADJUSTED LAT/LONGS.

WELL CODE	SEQUENCE #	LAT	LONG	SAMPLES <small>FROM W TO</small>	COMMENTS
BW-T-1-79	✓ 14A	3358.00	775812	0 - 1300	SOUTHPORT, N.C.
CM-T-1-79	✓ 21	3619 35	760832	80 - 970 W	BELLCROSS, N.C.
CR-T-1-79	✓ 17	344618	763842	0 - 960 W	BEAUFORT, N.C.
CN-T-4-79	✓ 16	345442	765318	0 - 960 W	CHEERRY POINT, N.C.
DR-T-1-79	✓ 19	354507	754739	0 - 950 W	STUMPY POINT, N.C.
HY-T-1-79	✓ 18	353112	755916	0 - 980 W	ENGELHARD, N.C.
LN-T-1-79	✓ 16A	351542	773518	0 - 750 W	KINSTON, N.C.
NH-T-1-79	✓ 14	341200	775324	0 - 1250 W	WILMINGTON, N.C.
ON-T-1-79	15	343900	771900	0 - 960 W	JACKSONVILLE, N.C.
PS-T-1-79	20	361649	761235	0 - 1000 U	ELIZABETH CITY
ON-T-2-79	15A	343136	772718	0 - 310 U	SNEADS FERRY "

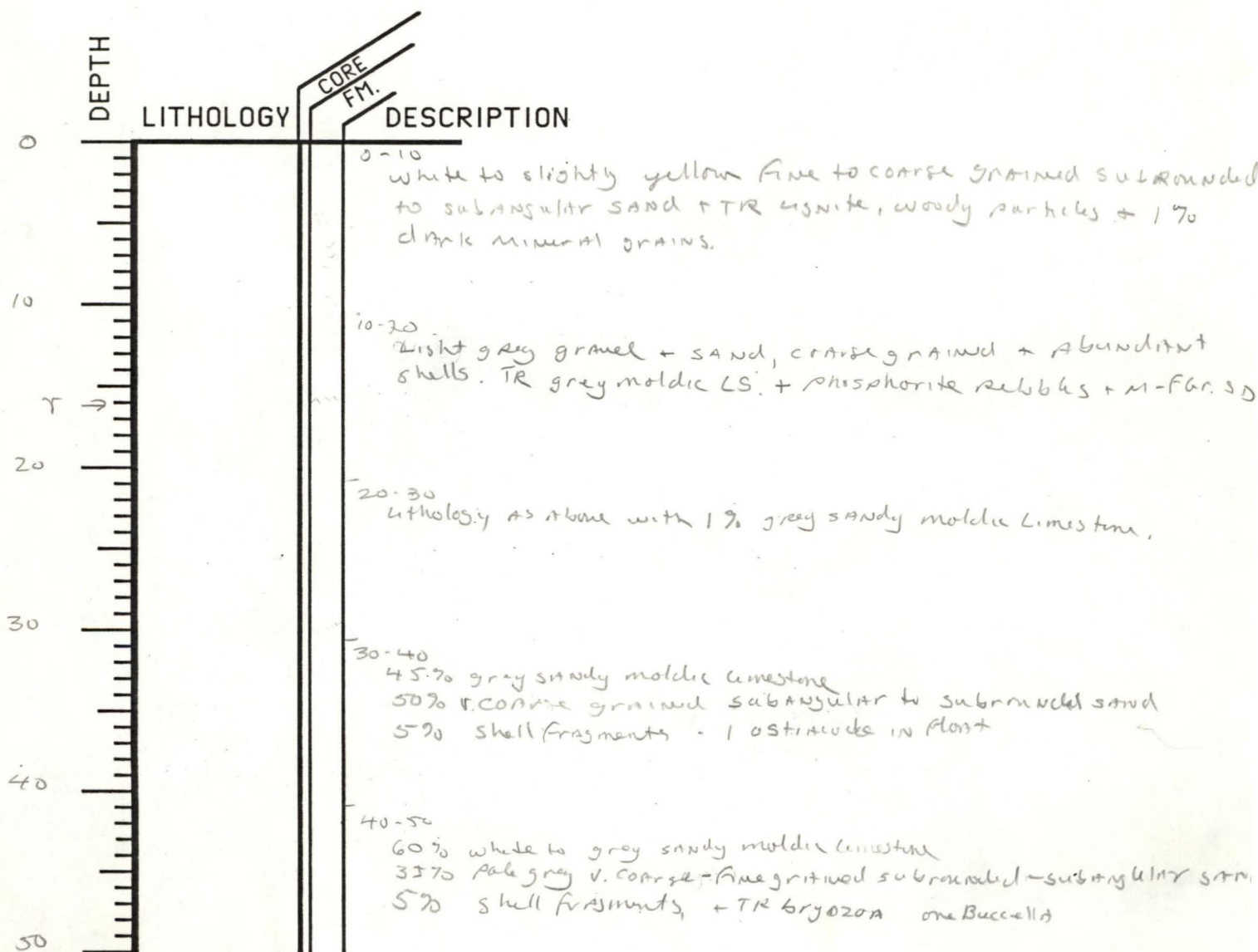
WELL CODE BW-T-1-79

ELEVATION 25'

T.D. 1532'

8 Los ok

13 more samples 50'-150'



WELL CODE

BW-T-1-7g

PAGE # 2

60

50-60

Coarse to fine grained orange/brown subrounded sand + 1% dk brown sandy clay, also abundant small lith. (reduced sample size + log + lith suggest a sandy clay here.

70

60-70

Medium to fine grained ^{75% coarse} yellow/white subrounded to subang. sand + TR shells + dark mineral grains (looks just like 0-10' sample)

80

70-80

Lithology as above

90

80-90

Lithology as above except no coarse grained sand

100

90-100

Lithology as above

110

100-110

Lithology as above plus 4% fresh + weathered glauconite + 1% grey clay. - LNT sp. observed 2.

120

110-120

Medium to fine grained yellow/white subrounded - subang. sand + 1% dark mineral grains - as white in float

130

120-130

Lithology as above

140

130-140

Lithology as above

150

140-150

Lithology as above.

Over

I have a hard time believing that samples ^{examined from} between 507-150
are representative of formations drilled. Either there were
hole problems while drilling, or samples are just not
from the interval marked on the logs.

F3 5/1/90

8 log correlations from BW-P-5-69
and BW-P-7-69, 73 6/90

BW-T-1-79

JPI

0

20

Old
25'

40

60

67'

80

Castle
Haynes

100

Beaufort

120

140

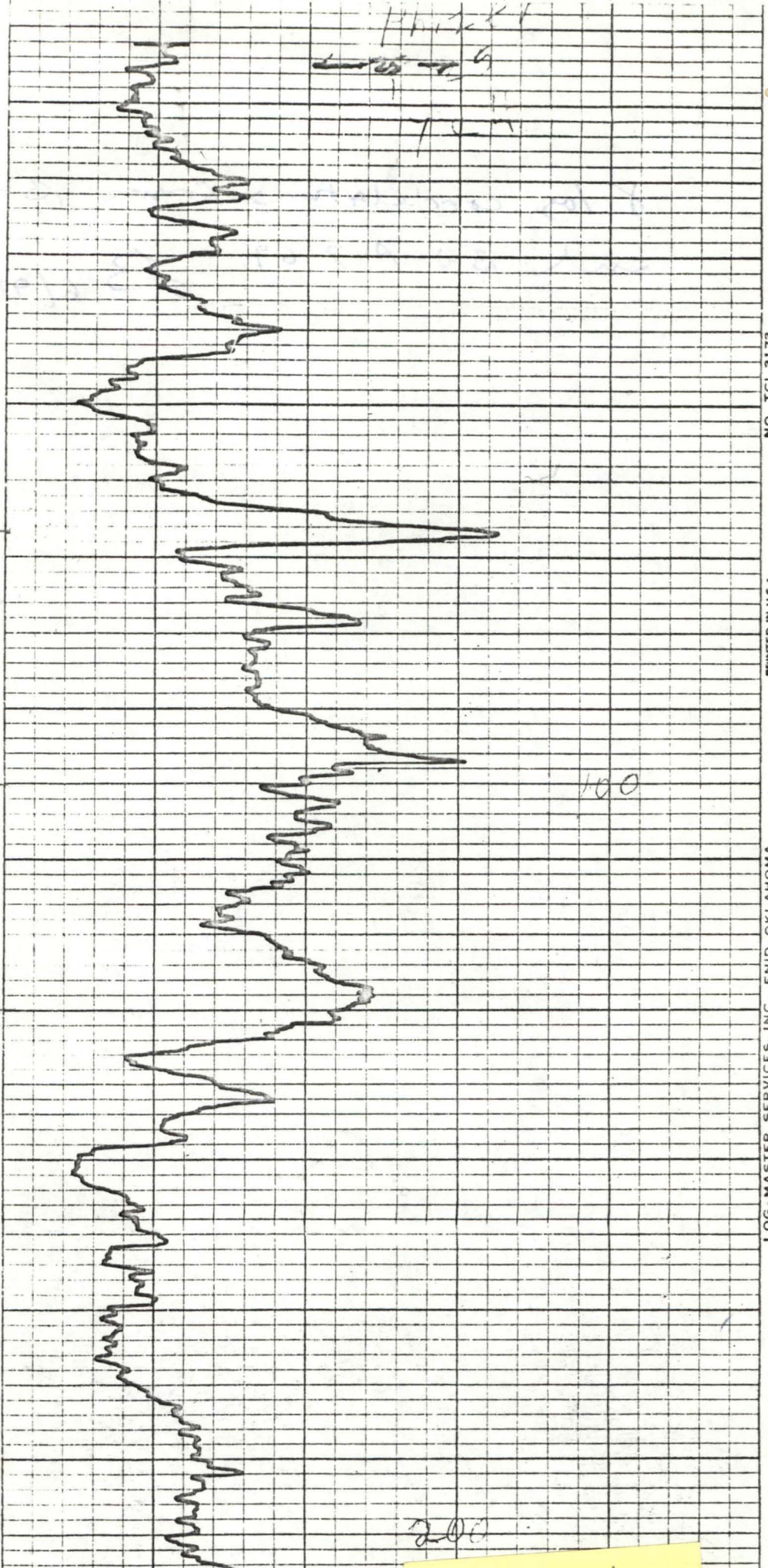
PD

160

180

200

Handwritten notes and scribbles at the top of the log.



23

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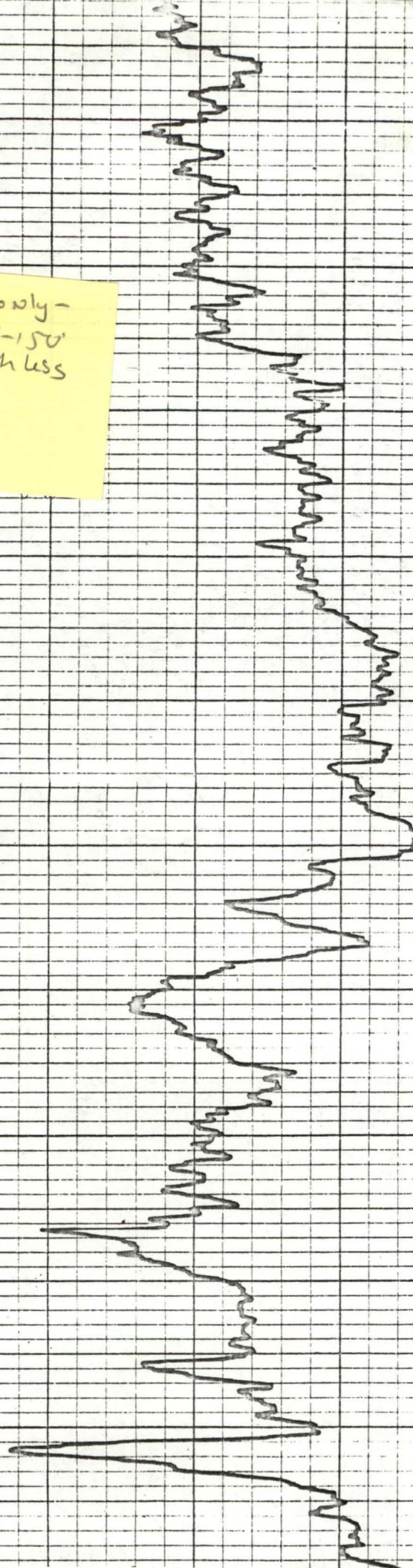
NO. TCI 3173

LOG-MASTER SERVICES, INC. ENID, OKLAHOMA

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NC

Use logs only -
Samps 50'-150'
are worthless



100

140

120
Barnhart

80
Castle
Hydrus

200

240

220

200

180

160

140

120

100

80

60