

SEE GENERAL FILE
"GEOHERMAL VPI/DOE"
FOR REFERENCE

PS-T-1-79

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.

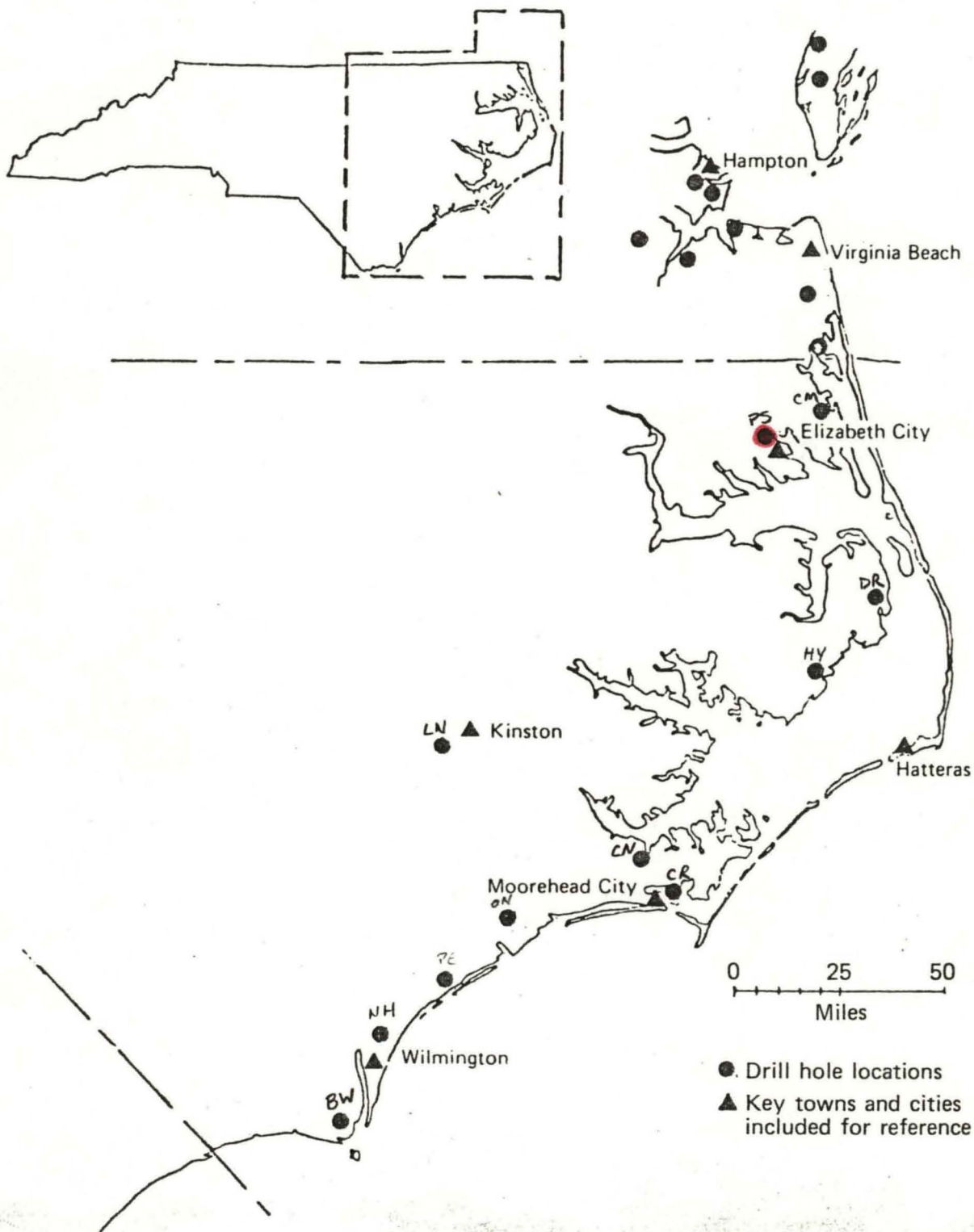
10. Environmental Impact Assessments, Division of Budget Management, 116 W. Jones St., Raleigh, NC 27603, Crys Baggett, Clearinghouse Supervisor, (919) 733-7061.
11. State Coupled Reservoir Assessment Program, VPI&SU, Blacksburg, VA 24061, Prof. John Costain, Geothermal Program, (703) 961-5096.

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.

ESTIMATED
BASEMENT SURFACE
DEPTH TEMPERATURE
(KN) ('C)

| HOLE | LATITUDE | LONGITUDE | INTERVAL(M) | GRADIENT SIGMA(REGR, N) (°C/KM) | COND SIGMA(N) | HEAT FLOW | ESTIMATED BASEMENT SURFACE DEPTH TEMPERATURE (KN) ('C) |
|---|----------|----------------|-------------|------------------------------------|---------------|-----------|---|
| BW-T-179 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 | |
| PS-T-1-79 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.

PROGRESS REPORT

OCT 1, 1978 - MARCH 30, 1979

VPI #SU-5648-5

GEOTHERMAL HOLES

ADJUSTED LAT/LONG's.

| WELL CODE | SEQUENCE # | LAT | LONG | SAMPLES | COMMENTS |
|-----------|------------|---------|---------|-----------------------------------|--------------------|
| BW-T-1-79 | 14A | 3358.00 | 775812 | FROM W #10 0 - 1340 | SouthPort, N.C. |
| CM-T-1-79 | 21 | 3619.35 | 760332 | .80 - 970 W | BELLCROSS, N.C. |
| CR-T-1-79 | 17 | 344618 | 763842 | 0 - 960 W | BEAUFORT, N.C. |
| CR-T-2-79 | 16 | 345442 | 765318 | 0 - 960 W | CHERRY POINT, N.C. |
| DR-T-1-79 | 19 | 35457 | 754739 | 0 - 950 W | STUMPY POINT, N.C. |
| HY-T-1-79 | 18 | 353112 | 755916 | 0 - 980 W | ENGLEHARD, 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 | 3439.00 | 7719.00 | 0 - 960 W | JACKSONVILLE, N.C. |
| PS-T-1-79 | 20 | 361649 | 761235 | 0 - 1000 W | ELIZABETH CITY |